SCHOOLING, OCCUPATION, AND EARNINGS: THE CASE OF SINGAPORE

BY

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So many friends and colleagues have contributed to this thesis that it is impossible to thank all of them, I am personally indebted to Chimene Ng for her encouragement and helpful comments. Responsibility for errors that remain, are certainly mine.

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CHAPTER ONE

INTRODUCTION

Studies investigating the distribution of labour incomes are enormous in economic literature which may date back to Ricardo. The focus by that time is the functional or factor-share approach.[1] The heterogeneity of rewards among occupations to individual workers did not escape the attention of classical economists. Much of the explanation of income distribution may by summarised in two famous principles:

1. Adam Smith's compensatory principles is based on the strength of competitive force and accounts for different combinations of pecuniary and nonpecuniary benefits in individual's income. Labor mobility will tend to equalize wage differentials. The notion of equalizing wage is found in Adam Smith's the Wealth of Nations, he described: "the whole of the advantages

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[1] See, Jacob Mincer, "The Distribution of Labor Incomes: A Survey", Journal of Economic Literature, March/1970 or Gian Singh Sahota", Survey on Personal Income Distribution", Journal of Economic Literature, March/1978.

and disadvantages of the different employments of labor must be either perfectly equal or continually tending towards equality. If there was any employment evidently either more or less advantageous than the rest, so many people would crowded into it in the one case and so many desert it in the other, that its advantages would soon return to the level of other employment".[2]

2. J. Mill's and J.E. Cairne's noncompeting groups' doctrine, states that in the absence of high mobility real income differences will result.

In brief, these two famous principles are an optimization model of wage differences and may be said that it is an individual choice theory in the explanation of income distribution. One of most important economists in this theory is Milton Friedman, he developed a theory of risk in an individual's choice among occupations.

During the 1950's, under the inspiration of Theodore W. Schultz, the theory of human capital has received much attention. The modern vintage of the human capital theory as against the 'old vintage' theory developed by Adam Smith

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[2]Adam Smith, An Inquiry into the Nature and Causes of the Wealth of Nations. (London: Routledge & Co.) PP. 76-77.

and Alfred Marshall,[3] was conceived and developed largely, but not exclusively, by the Chicago School. The human capital theory is developed largely in a competitive setting. Theorists in this field accepted the principle of equalizing difference, but pay very little attention to the principle of non-competing groups. Human capital theory is capable of explaining earning differentials in many aspects though in its simple form makes strong assumptions about other aspects.

1. The labor market is assumed to be perfectly competitive and functioning, so that a person can have a free choice in selection of occupation,
2. If a person wish to train a particular job, there are no barriers to prevent him in doing so,
3. There are no environmental inequalities, such as difference in cognitive abilities, physical skills or home background.

According to human capital theorists, given such a perfectly functioning, competitive labor market and homogeneity of all people and jobs, there would be no differences in earnings, because if any differential occurs, everyone

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[3] A survey of the history of human capital theory may be found in Bernard F. Kiker 'The Roots of Human Capital' Journal of Political Economy. 1968

would flock to the high-paying jobs and equality would be restored through the competitive process.

On the other hand, if all people are alike in a perfectly functioning labor market but only jobs differ, then there would be no earnings differentials so that everyone is indifferent about which job he does. In other words, there would be an equalization of "net advantages and disadvantages" in all occupations.

However, the picture of equalizing differences is obviously unrealistic as there is no way to assume that choice among occupation can be perfectly substituted. A person may wish to be a police constable rather than a labourer, but fails to pass the physical examination. Another may prefer to be a doctor rather than a conductor, but lack the money required to support him to the medical school. The differentials in abilities and differences in opportunities are thus important aspects in understanding the inequalities in person income in which equalizing wage is hardly observed.

Finally, the assumption of perfect market competition may well seem out of place in a world where wages appear to be determined largely by trade union negotiations or intervented by government authority or impeded by frictions of all kinds.

In the past two decades, a wide range of human capital theories have been put forward to explain the correlation between an individual's schooling and his subsequent earnings. Most studies in the economics of education follow the line of Becker and Mincer by measuring earnings as a dependent variables with schooling, work experience, socio-economic background or innate ability as determinant variables. Very few of them take job characteristics and non-pecuniary benefit into account. The consumption-beneifts of education and non-pecuniary aspects had long been ignored in economics of education, for example, it has never been mentioned in rate-of-return of calculation. But as Samuel Bowles pointed out, one's educational level and social class do not determine one's income, rather, they determine one's opportunity. Opportunity takes the form of a choice among jobs, each offering a different combination of monetary and non-monetary rewards.[4] The choice constrained by what could be called the occupational opportunity set. It may be illustrated by figure 1:-

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[4] Samuel Bowles, "Schooling and Inequality from Generation to Generation." Journal of Political Economy. May/June, 1972.

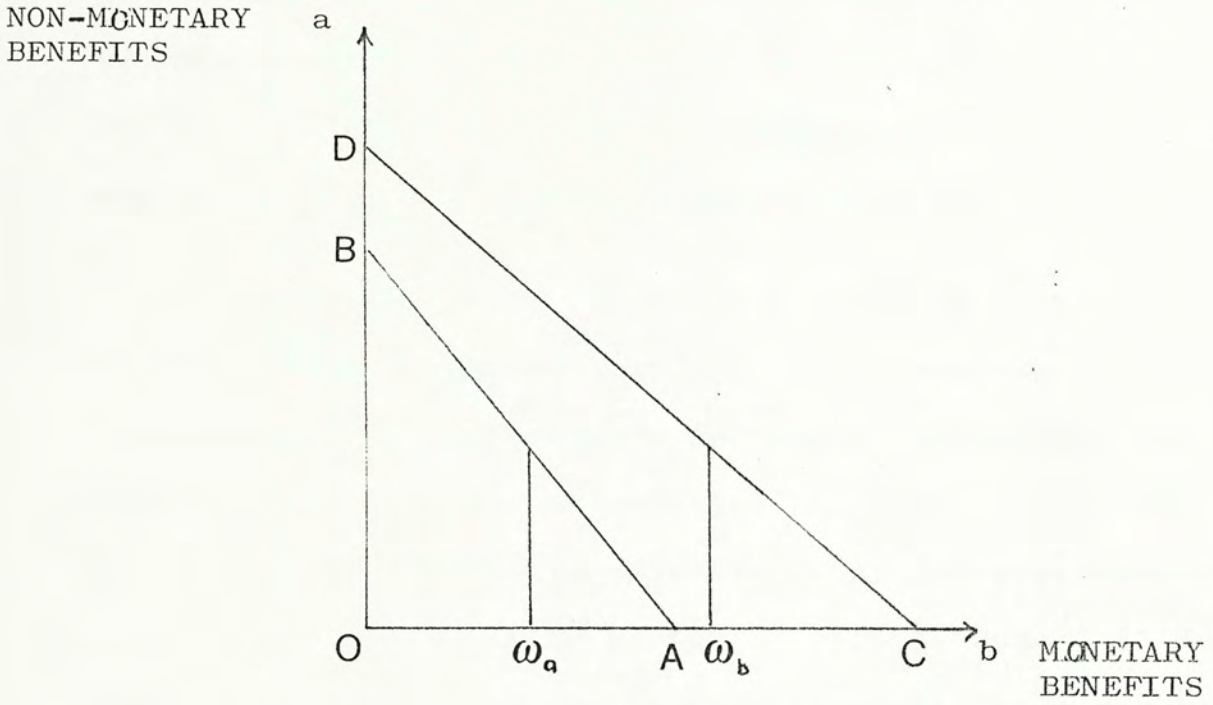

Figure 1

Each job is characterized by an expected monetary income and non-monetary benefits (or costs) of the associated work. The occupational opportunity set OAB indicates the job available to a person from a family with low socioeconomic background and has attained less schooling. Another occupational opportunity set OCD measures an individual from high-status family who enjoys relatively more years of schooling. If preferences for the monetary and non-monetary aspects of a job are associated

with personal characteristics and educational attainiment. The occupations chosen may be illustrated by point W_a and W_b, the monetary income between the two individuals (W_b - W_a) thus understate the differences in real income which may be measured by monetary incomes axis (C - A).

Therefore, the explanatory power of usual estimation in basic schooling model may greatly understate the relation between real income or job opportunity on the one hand and also the personal characteristics and schooling on the other. If schooling is the main determinant of job preferences, the coefficient of schooling variables will be under-estimated, that is why Shaffer said, "occupations with considerable non-pecuniary benefits are highly correlated with the distribution of education in the labor force, and to ignore this factor is to understate the private rate of return to education".[5]

In short, if rate-of-return calculation is made with monetary income only, then the addition of non-monetary factors or the insertion of job characteristics factors may

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[5]H.G. Shaffer, 'A Critique of the concept of human Capital.' American Economic Review Vol. 52, 1961 No.4 Pp. 1031-1032.

change these estimates[6] to a large extent. If rate-of-return calculations are a guide to the allocation of resources to education, the estimation without taking non-monetary factors into account will be inevitably biased.

There are several reasons why job characteristics and non-pecuniary benefits are often missing in human capital analysis. The most important one, as I observed, is the difficulty in interpreting these unquantified variables besides the problem of data availability. However, with the assistance of a set of job characteristics classified by the Dictionary of Occupational Titles. Robert Lucas has demonstrated that it was possible to measure the impact of the job characteristics in a wage equation as well as personal characteristics.[7] In following his methodology, this thesis will try to use data from a Stanford Labor Survey conducted in Singapore in 1974 to investigate the effect of job characteristics and non-pecuniary benefits.

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[6]For example, G. Hanoch, "An Economic Analysis of Earnings and Schooling." Journal of Human Resources, No.2 1967. Jacob Mincer, Schooling, Experience and Earnings. (New York: Columbia University Press, 1974)

[7]Robert Lucas, Working Conditions, Wage Rates and Human Capital: A Hedonic Study. Unpublished doctoral dissertation, M.I.T. Oct., 1972.

In the following chapters, Chapter Two is an analysis of data sources and background information. Chapter Three is a study of a hedonic wage equation in which both the characteristics of people and the characteristics of job are included as independent variables. Chapter Four is a study of the hedonic wage relationship among four major occupation groups. This framework also allows us to estimate an equation which includes both measures of certain skills and taste preferences. Though we do not have direct measures of the non-pecuniary aspects of various occupations in the Stanford Labor Survey, we do have some crude information related to the preference of individuals for specific non-monetary aspects of a job. The empirical results of these estimations are quite satisfactory. Chapter Five is a follow-up of Chapter Three and Chapter Four. Both pecuniary and non-pecuniary rewards are considered as dependent variables. We try to demonstrate that with the insertion of the non-pecuniary measures as dependent variables, the importance of certain independent variables may be changed. In this chapter, canonical correlation technique is used. Conclusion is found in Chapter Six which reports a summary of all the empirical work done and a discussion of the implication of job characteristics, within occupation regression and the pecuniary and non-pecuniary models in relation to income distribution.

CHAPTER TWO

DATA SOURCES AND BACKGROUND INFORMATION

The data on which this research is based were mainly derived from a Stanford Labor Survey of manufacturing workers and firms in Singapore carried out in June/July, 1974. Thus survey was supervised by Dr. Pak-wai Liu, Stanford University and now Lecturer in Economics, United College, the Chinese University of Hong Kong. Part of the information is obtained from a survey of manufacturing firms conducted by Economic Research Centre, University of Singapore in June/July 1974.

Stanford Labor Survey was conducted by Dr. Liu with the assistance with Survey Research Singapore (Pts.) Ltd. in field work. Table 1 is a summary of the nature and firm size of manufacturing firms surveyed:-

TABLE 1

PROFILE OF MANUFACTURING FIRMS BY FIRMS SIZE

Firm Size	Less than 50*	50 - 99	100 And above	Total
	72	16	36	124
1. Type of Organisation				
Sole Proprietorship	21	1	-	22
Partnership	18	-	-	18
Public Limited Com.	33	14	33	80
2. Type of Ownership				
Wholly Local	54	9	12	75
Joint Venture	7	-	10	17
Wholly Foreign	11	7	14	32
3. Age of Firm				
Less than 2 years	12	2	5	19
3-5 years	16	1	14	31
5 years and above	44	13	17	74

* the number means workers.

Source: ERC, University of Singapore, Survey of Manufacturing Firms, 1974.

The sampling for the survey was taken from a list of manufacturing firms employing 10 workers or more in 1973. From this list, a stratified random sample of 150 firms based on employment size of each three-digit industrial group was drawn. Altogether, 124 firms co-operated in the survey. These firms employed a total of 17,608 workers, about 9% of the total workforce in manufacturing sector.[1]

The structure of manufacturing sector in Singapore is shown in Table 2.

TABLE 2

STRUCTURE OF MANUFACTURING SECTOR

Category	Output	Employment
Petroleum refining	30.7	1.5
Machinery including electrical and electrical products	14.8	23.1
Food & Beverages	11.3	6.9
Transport Equipment	9.6	13.9
Textiles, wearing apparel & footwear	7.1	19.5
Percent of toal	73.5	64.9

Source: Singapore Government: Annual Budget Statement 1974

[1] In Monthly Digest of Statistics, 1973, the employment in manufacturing sector was 172,126 which accounted for 33.5% of the total workers in Singapore.

In terms of output, the petroleum refining is the largest industry in Singapore responsible for about 30% of the total output in the manufacturing sector. Among the five major refineries: Shell, Esso, Mobil, British Petroleum and Singapore Petroleum, only the last one, Singapore Petroleum Co. (Pts.) Ltd. was included in our survey, it is a local corporation owned 1/3 by the Development Bank of Singapore, 1/3 by Amoco, and 1/3 by Oceanic Petroleum,[2] it employed 298 workers during the survey in 1974. The second largest category of industry contributed around 15% of the total output. This industry mainly concentrated in production of machine tools and other types of capital equipment. A growing portion in this industry is involved in the production of semi-conductors, integrated circuit and etc. Owing to its various assmebly operations, this sector is the largest employer of labor force with around $\frac{1}{4}$ of the total manufacturing employment. In our survey, around 30 firms in the second category were included, they employed about 8209 workers and 229 of them were interviewed in the survey. The other largest categories are food and beverages, transportation equipment and textiles respectively. Table 3 shows a breakdown of employment size by the time of the Survey:-

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[2]Theodore Geigor, Tales of Two City-States: The Development Progress of Hong Kong and Singapore, (New York: National Planning Association, 1973) P.170.

TABLE 3

STRUCTURE SIZE IN SINGAPORE BY INDUSTRY

Industry	Employment			Job Vacanies
	Male	Female	Total	
Food & Beverages	516	513	829	16
Tobacco	45	22	67	-
Textiles	170	337	507	230
Apparel & Footwear	319	1125	1444	218
Wood & Furniture	432	142	574	25
Paper & Printing	196	90	286	14
Rubber Products	30	37	67	1
Chemicals	290	59	349	21
Petroleum	344	65	409	9
Non-metallic Minerals	129	6	135	6
Metal Products	604	337	941	93
Machinery	1409	5386	6795	200
Electrical Products	389	299	688	30
Transport Equipment	3155	482	3637	271
Misc.	107	179	286	28
Total	8135	17014		1162

Sources: ERC, University of Singapore, Survey of Manufacturing Firms, 1974.

In the Stanford Labor Survey, only male workers were selected for interview, Table 4 is a summary of the selected workers:-

TABLE 4

PROFILE OF SELECTED WORKERS

	Total	High Level*	Low Level**
No. of male workers in selected firms at the time of interview	8436	785	761
No. of male workers selected	1565	460	1105
No. of male workers interviewed	1249	334	915
Response rate	79%	72%	82%

* High level refers to job classification 1 to 5; namely Proprietor/Partner/Shareholder, Managers, High-level Executives, Middles-level Executives and Professionals.

** Low level refers to job classifications 6 to 10; namely work-area supervisors, tradesman, clerical, production workers and miscellaneous workers.

Source: Stanford Labor Survey, 1974

A breakdown of job categories of the interviewed male workers is shown in table 5.

TABLE 5

BREAKDOWN OF JOB CATEGORY

Job Category	No. of Interviewed
Proprietor/Partner/Shareholder	83
Manager	102
High Level Executive	46
Middle Level Executive	43
Professional	58
Work Area Supervisor	73
Tradesman	304
Clerical	76
Production Worker	265
Miscellaneous	199
	Total 1249
Persons employed in all industries	824349
Persons employed in manufacturing sector	234231

Source: Stanford Labor Survey and Statistical Year Book for Asia and the Pacific, 1975. United Nation.

The male workers selected in this survey were asked a total of 49 questions. These questions were designed to measure an individual's socioeconomic background, educational attainment, earnings and job preferences. A sample of the

questionnaire may be found in Appendix A. All the data obtained in this survey is compiled and stored in magnetic tapes. The analysis throughout this study is based on this data set. Table 6 is a summary of mean and median monthly salary of workers by education obtained from this survey. It will give a general picture of the earnings of male workers in Singapore in 1974.

TABLE 6

PROFILE OF WORKERS BY JOB EARNINGS AND EDUCATION

ob ategory	No Schooling	Primary	Secondary	Pre-University	College	Vocational Institute	University	Total
nagerial								
Mean	-[a]	-	1207.4	-	2292.1	-	2060.8	1798.5
Median	-	-	1025.0	-	1816.7	-	1812.5	1517.6
ofessional								
Mean	-	-	-	-	1694.4	-	1356.5	1478.8
Median	-	-	-	-	1210.0	-	1041.7	1206.3
erical								
Mean	-	325.0	447.1	447.5	-	-	-	449.7
Median	-	330.0	408.3	450.0	-	-	-	422.2
pervisory								
Mean	-	461.0	577.2	-	-	-	-	506.3
Median	-	437.5	515.4	-	-	-	-	561.0
adesman								
Mean	-	436.8	405.2	-	614.3	410.7	-	428.4
Median	-	450.0	390.9	-	537.5	390.0	-	403.5
oduction								
Mean	285.7[b]	315.4	278.5	-	-	-	-	290.9
Median	277.8	284.0	260.9	-	-	-	-	271.9

a Mean and median not computed if number of cases is less than 10

b All in Singapore dollars.

Source: Stanford Labor Survey, 1974

CHAPTER THREE

HEDONIC WAGE EQUATION AND JOB CHARACTERISTICS

I. THEORETICAL FRAMEWORK

The aim of this chaper is to investigate how individual's wage varies, ceteris paribus, with indicators of the quality of working life by including job characteristics variables into a wage equation as well as personal characteristics. This kind of wage equation, following Kelvin Lancaster's terminology may be called a hedonic price equation.[1]

The so-called 'New Approach' to demand theory in which Lancester's introduces the hedonic price function is based on two propositions:

1. All goods possess objective characteristics relevant to the choices which people make among different collections of goods. The relationship between a given quantity of a good and the characteristics which it possess is essentially a technical relationship depending on the objective properties of the goods.

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[1] See Kevin Lancaster, Consumer Demand: A New Approach, (New York: Columbia University Press, 1971).

2. Individuals differ in their reactions to different characteristics, rather than in their assessment of the characteristics content of various goods collections. It is the characteristics in which consumers are interested. They possess preferences for collections of characteristics, and preferences for goods are indirect or derived in the sense that goods are required only in order to produce the characteristics.

Using these two fundamental propositions, Professor Lancaster of Columbia University said, "we view the relationship between people and things as at least a two-stage affair. It is composed of the relationship between things and their characteristics .... and the relationship between characteristics and people (personal, involving individual preferences)".[2]

A wage equation (with job characteristics and personal characteristics inserted apparently also belongs to the general class of hedonic price functions.[3] A hedonic wage equation essentially includes two set of variables, one describing people and the other describing their job.

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[2] ibid P. 7

[3] For a theoretical discussion of hedonic price equation, see R.E. Lucas, 'Hedonic Price Equation', Economic Inquiry. Vol. XIII June/1975.

Its major difference from the Lancastrian model, however, is that the job market is not the same as the goods market, as the entrepreneurs are not indifferent to the identity of workers to whom they sell jobs as in the sale of consumer goods. The hedonic wage equation, therefore, embodies two quite distinct sets of characteristics as mentioned above.

The basic philosophy behind the model is that we think an individual obviously cares about his monetary rewards from his job, but at the same time, he would also care about the quality of his working life. He may prefer to keep his present job with less income and refuse to accept a job with high pay and a working environment embracing extremes of heat and cold or with risk of bodily injury. Jobs with hazard or unhealthy conditions may have to pay higher wage rate in order to obtain sufficient number of workers.

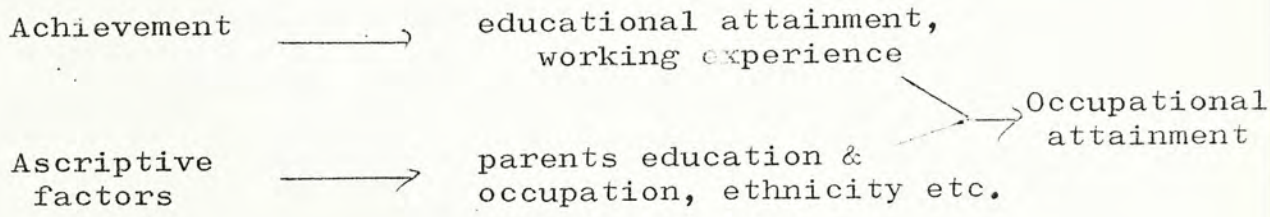
The attitudes to monetary and non-monetary rewards undoubtedly vary from person to person as then taste preference. Some may be risk-taking and willing to take up challenging job while others may readily enjoy an occupation with repetitive nature. Ample empirical evidence suggested,

however, taste may be effected by an individual's socio-economic background and his educational attainment. For example, Sewell and Hauser had shown that socioeconomic background has significant correlation with a person's occupational achievement. He found that,

> 'Socioeconomic background affects ability, that socioeconomic background, ability, and educational attainment affect occupational achievement, and that all of the preceding variables affect earnings!'[4]

This interrelationship is, however, not surprising.

In their landmark study, Blau and Duncan concluded that certain ascriptive and achievement factors in combination determine the occupational attainment of an individual in the following process![5]



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[4]William Sewell and Robert Hauser, Education, Occupation and Earnings: Achievement in the Early Career, (New York: Academic Press, 1975) P. 85

[5]Peter M. Blau and Otis Dudley Duncan, The American Occupational Structure, (New York: John Wiley & Sons, 1967).

Herbert Gintis of the Harward University suggested that noncognitive personality characteristics has a direct effect on workers' earnings and productivity, he said:

> "The authority, motivations, and interpersonal relations codified in the 'Social Structure' of schools are closely similar to those of the factory and office. Thus a path of individual personality development conducive to performance in the student's future work roles is facilitated."[6]

Schooling, therefore, serves as a major function of socializing an individual. Different levels of schooling socialize the students with different values and attitudes. As Dr. Liu put it,

> "in the elementary school students are taught to be obedient to authority, to learn by rote and to accept discipline. This prepares them for future blue-collar jobs that require these attitudes. On the other hand, college students are encouraged to be creative, to take initiative in doing things and to train for the leadership role. These are the attitudes required in jobs involved in making complex administrative and organizational decisions decisions in the corporate society. By inculating different attitudes according to the different

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[6] Herbert Gintis, 'Education, Technology and the Characteristics of Worker Productivity'. American Economic Review, May/1971. PP.266-267.

levels of schooling, education serves to consign individuals into different rungs of the job ladder."[7]

Therefore, in contribution of schooling to earnings may not be solely explained by the simple schooling model. The noncognitive personality characteristics in fact has a more direct bearing on worker earnings and productivity. Therefore, the inserting of both personal characteristics and job characteristics into a wage equation has important meaning.

Secondly, dissatisfaction may be derived in performing a job involving the use of more or less of an ability than is possessed by an individual. For example, Chien Ching-yung (陳景潤), the famous Chinese mathematician, will appreciate a teaching job in the University. If he is assigned to be factory worker, however, dissatisfaction may be derived as he has high intelligence but low physical ability. Another person with different comparative advantage[8] may reverse the preference ranking of

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[7] Pak-wai LIU, Education and Socioeconomic Status in Labor Market Segmentation, mimeo. A paper presented at the conference on Employment, Under-employment and Unemployment of Graduates, Development Centre, Organization for Economic Co-operation and Development. Paris on July 1-4, 1975. P.11

[8] This term is borrowed from Jan Tinbergen, "On the Theory of Income Distribution", Weltwirtschaftliches Archiv, 1956/77 and for detailed analysis, see Michael Sattinger, 'Comparative Advantage in Individuals' Review of Economics and Statistics, No. 2, May/1978 P.209-267.

those jobs. Robert Lucas therefore[9] postulated each worker's utility function may be written as:

$$U^a = U (w_i^a, P^a, Q_i, e^a) \quad \ldots\ldots\ldots\ldots\ldots\ldots \quad (1)$$

where U^a represents utility of worker a

W_i^a = the wage rate offered to worker a for job i

P^a = vector of personal characteristics of worker a[10]

Q_i = vector of job characteristics

e^a = unobserved, idiosyncratic elements in the utility function of worker a.

This utility function[11] may also be represented as follows:

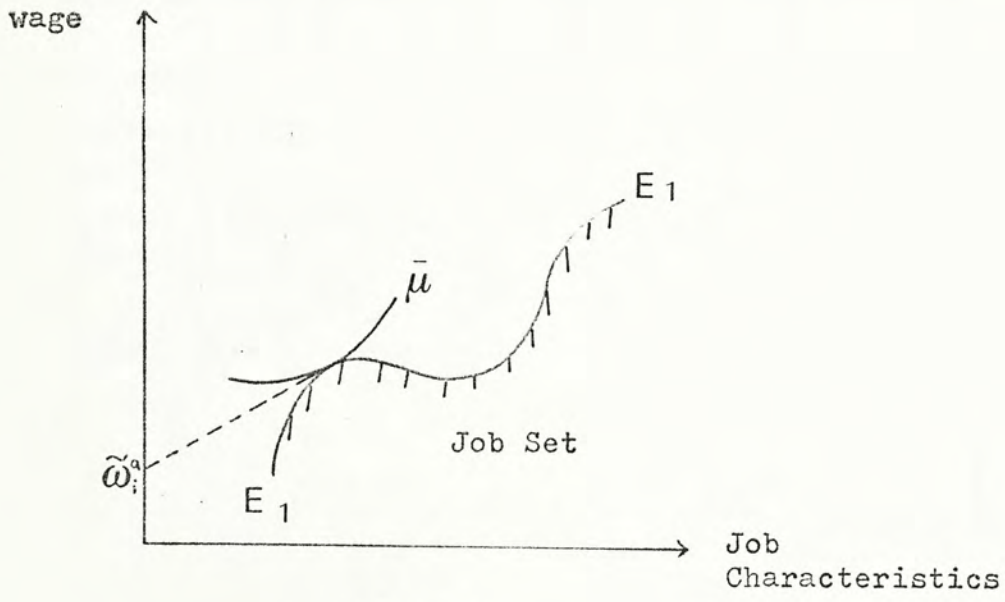

FIGURE 1

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[9] Robert E.B. Lucas, 'Hedonic Wage Equations and Psychic Wages in the Returns to Schooling', American Economic Review, Sept. 1977. P.550.

[10] P^a is included into the utility function to measure the 'taste' facot as outlined above.

Workers choose from a set of jobs bounded by a function, such as E_1 E_1. An individual will choose his job according to his preference at the point where the indifference curves are tangential to the frontier. There may exist many frontiers with common wage offered within its occupation set. When an individual chooses job i in maximizing equation (1), the result is an equating of the marginal rate of substitution between wage rate and the job characteristics with the ratio of their shadow prices determined on the different frontiers. Solving these equalities, we obtain a set of supply functions for each worker:

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[11] The work-leisure problem may be treated in Equation (1) in two ways:

a. by viewing leisure as a 'job' which the worker either does or does not perform. It may regard it as an activity with a single input (time) and a single output (income). The occupational choice of an individual may be represented as follows:-

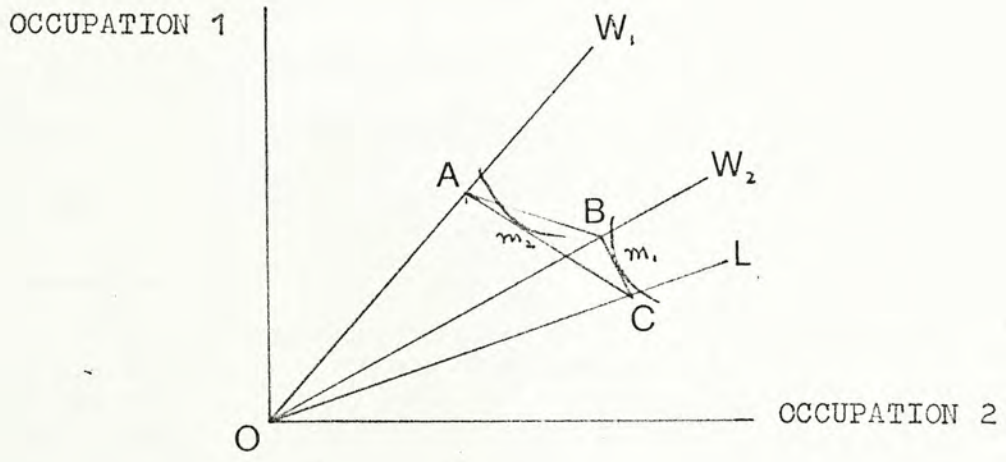

FIGURE 2

$$\theta_i^a = (W^a, P^a, Q_i, e^a) \text{ for all } i, a \quad \ldots\ldots\ldots (1)$$

where $\theta_i^a = 1$ if worker a chooses occupation i

$= 0$ otherwise

$W^a =$ vector of $(W_1, W_2, \ldots\ldots W_i)$

In our model, the demand side or the firm's choice is represented as the net profit generated by the worker. The demand function is written as

$$\pi^a = \pi(W^a, P^a, Q_i, \zeta^a) \quad \ldots\ldots\ldots\ldots\ldots\ldots (3)$$

where π^a = Net profit generated by worker a

ζ^a = Unobserved, idiosyncratic skills not reflected in P^a

The argument for introducing a vector of personal characteristics into the demand function is conventional. It is a basic postulate of human capital theory that productivities vary from person to person even though the schooling variable is controlled. It is likely that personal abilities affected job performance to quite a large

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Cont. [11] L is the characteristics combinations from leisure as an activity, the frontier consists of lines AC (Combinations of work-consumption activities W_1 and leisure) and BC (combination of W_2 and leisure). The choice of occupation depends on an individual taste, being m_1 or m_2. For details, see Kevin Lancaster, op. cit. P.103.

extent.[12] furthermore, it is quite obvious that the willingness to supply effort of an individual very much depends upon the nature of the task involved. Job characteristics are, therefore, included.

If equation (3) is acceptable, again maximization leads to a point at which the efficiency frontier is tangential to an isoprofit curve ee. The isoprofit curves refer to an identical going wage rate for all relevant job.

Solving equation (3), we have,

$$\sim_{\tau}{}^{a}_{i} = \tau(W, P^{a}, Qi, \zeta^{a}) \text{ all } i, a$$

where $\sim_{\tau}{}^{a}_{i}$ = 1 if the firm decides to hire worker a for job i

= 0 otherwise

Cont. b. by measuring hours of work supplied. See Sherwin Rosen, 'On the Interindustry Wage and Hours Structure'. Journal of Political Economy, March/April 1969.

[12] For detailed discussion of the production and human capital, see Yoram Ben-Porath, "The Production of Human Capital and the Life Cycle of Earnings". Journal of Political Economy, August/1967 and Paula Stephen, "Human Capital Production" Economic Inquiry, Vol. XIV December/1976.

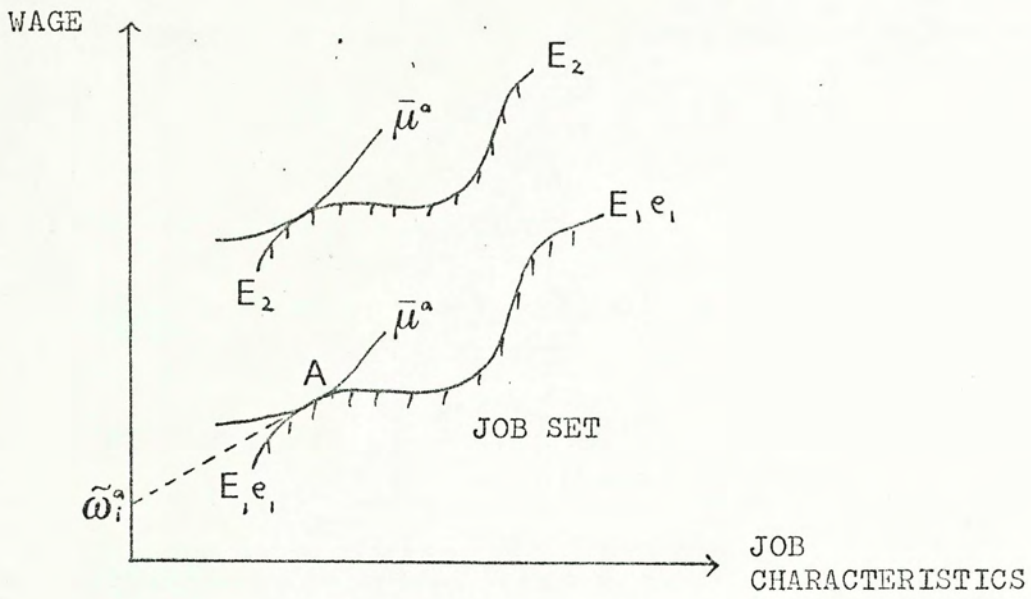

FIGURE 3

An equilibrium point will be reached when:

$$\theta_i^a = \tilde{\tau}_i^a$$

In this equilibrium the two efficiency frontiers for a worker, EE and ee, in Figure 2 must be coincidental and generate the touching point A. Solving the systems of equation

$$\theta_i^a = (W^a, P^a, Q_i, e^a)$$

$$\tilde{\tau}_i^a = (W^a, P^a, Q_i, \xi^a)$$

$$\Theta_i^a = \tilde{\tau}_i^a$$

We obtain the reduced form of the structural relations:

(1) Equilibrium wage or market-clearing value of W_i^a

$$W_i^a = W(P^a, Q_i, e^a, \zeta^a)$$

(2) Occupational allocation

$$t_i^a = t(P^a, Q^i, e^a, \zeta^a)$$

$$t_i^a = 1 \text{ if a is hired and selects for job i}$$
$$= 0 \text{ otherwise}$$

This is the basic equation that will be used in our model for estimation.

The theory described above was mainly developed by Robert Lucas.[13] He obtained some support to Adam Smith's concept of equalizing wage by using 1966-1967 population survey data in the United States. However, it is still untested in the context of developing nations. Singapore, in its process to industralization, is under rapid structural change in the economy. This structural change according to Wilbert Moore, can be divided into two processes, market participation and sectoral relocation.[14]

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[13] Robert, 1976 op. cit.

[14] See Wilbert Moore, "Changes in Occupational Structures" in Neil Smelser and Seymour Lipset (eds.) Social Structure and Social Mobility in Economic Growth. (Chicago: Aldine Press, 1966).

In developing economies like Singapore, transition from the traditional form of production to the modern, scientific methods is taking place. A dual labor market exists. On the one hand, the production units of the traditional sector tend to be small family-run factories which employ family members and a few helpers. This still constitutes a large portion of the economy. On the other hand, large modern factories which employ more than several hundred workers exist in the market at the same time. This modern production units are quite different from the traditional production units both in terms of the mode of production and shop customs. If this is true, the said theory in which Robert Lucas had proved to be rather successful may not yield support in Singapore.

II DATA SOURCES AND ANALYSIS

In order to estimate the reduced form wage equation as outlined above, it is necessary to have a set of observations on individual's earnings, personal characteristics and job characteristics.

Thanks to the Stanford Labor Survey, we have rich and relatively clean data on worker's earnings, education, race and some personal characteristics in the manufacturing sector of Singapore.

Earnings and Education in Personal Characteristics

The principal sources of an indvidual worker's monetary reward is the earned income. Table Seven to Twelve show the structural differences in earnings of six occupation categories of Singapore manufacturing workers and by educational level.

Abbreviation:-

NO-S	:	No schooling
PRI-NC	:	Primary education, not completed
PRI-C	:	Primary education, completed
SEC	:	Secondary education
PRE-U	:	Matriculation education

College : Post-secondary education

VI : Vocational Institution

UNIV : University education

Source : Stanford Labor Survey and Economic Research Centre, University of Singapore, Survey of Manufacturing firms, 1974.

TABLE 7

Profile of Managerial Workers by Education and Earnings

Education / Earnings	PRI	SEC	PRE-U	COLL	VI	UNIV	TOTAL
$0 - $499	-	6	1	-	1	1	9
$500 - $999	1	7	-	-	1	5	14
$1,000 - $1,499	4	7	1	5	1	7	25
$1,500 - $1,999	-	5	1	7	3	9	25
$2,000 - $3,999	2	1	2	5	1	13	24
$4,000 - $6,500	-	1	-	2	-	2	5
TOTAL	7	27	5	19	7	37	102

TABLE 8

Profile of Professional Workers by Education and Earnings

Education / Earnings	PRI	SEC	PRE-U	COLL	VI	UNIV	TOTAL
$650 - $999	1	1	1	4	-	11	18
$1,000 - $1,499	-	3	-	5	3	8	19
$1,500 - $1,999	-	2	1	4	-	3	10
$2,000 - $2,999	-	-	2	5	-	4	11
$3,000 - above	-	-	-	-	-	1	1
TOTAL	1	6	4	18	3	27	59

TABLE 9

Profile of Clerical Workers by Education and Earnings

Education / Earnings	PRI	SEC	PRE-U	COLL	VI	UNIV	TOTAL
$100 - $299	5	12	3	-	1	-	21
$300 - $349	5	3	1	-	1	-	10
$350 - $399	1	8	-	-	-	-	9
$400 - $499	1	6	2	-	-	-	9
$500 - $749	1	12	4	1	1	-	19
$750 - $999	-	6	-	-	-	1	7
TOTAL	13	47	10	1	3	1	75

TABLE 10

Profile of Supervisory Workers by Education and Earnings

Education / Earnings	PRE-NC	PRI-C	SEC	PRE-U	COLL	VI	TOTAL
$0 - $199	1	-	-	-	-	-	1
$200 - $349	7	-	5	-	1	1	14
$350 - $499	5	3	10	2	-	-	20
$500 - $749	7	1	13	-	1	2	24
$750 - $999	1	-	4	1	2	3	11
$1,000 & above	-	-	2	1	-	-	3
TOTAL	21	4	34	4	4	6	73

TABLE 11

Profile of Tradesmen by Education and Earnings

Education / Earnings	NO-S	PRI-NC	PRI-C	SEC	PRE-U	COLL	VI	UNIV	TOTAL
$100 - $199	-	2	1	14	-	-	2	-	19
$200 - $299	1	22	2	29	-	-	13	-	67
$300 - $349	1	13	1	13	1	1	4	-	34
$350 - $399	1	12	-	11	-	-	5	-	29
$400 - $499	-	28	8	23	2	3	7	-	71
$500 - $749	-	19	3	26	2	8	9	1	68
$750 - $999	-	2	1	3	1	1	2	1	11
$1,000 & above	-	-	-	2	1	1	-	-	4
TOTAL	3	98	16	121	7	14	42	2	303

TABLE 12

Profile of Production Workers by Education Earnings

Education / Earnings	NO-S	PRI-NC	PRI-C	SEC	PRE-U	COLL	VI	TOTAL
$0 - $199	-	20	1	20	1	-	2	44
$200 - $299	9	41	12	55	1	-	3	121
$300 - $349	4	15	2	11	-	-	1	33
$350 - $399	-	15	4	8	2	-	1	30
$400 - $499	1	10	2	9	-	1	-	23
$500 & above	-	5	2	4	-	-	-	11
TOTAL	14	106	23	107	4	1	7	262

B. JOB CHARACTERISTICS

The information on job characteristics is, however, missing from either the Stanford Labor Survey or Survey of Manufacturing Firms. This information is taken, in an alternative way, from the Dictionary of Occupational Titles (denoted as DOT hereafter). The DOT reports detailed job characteristics of 13,778 occupations from the DOT classification of occupations and groups these characteristics into a set of six worker trait components. It provides useful information in job characteristics. Research using this DOT sources and rating is however, few.

Worker traits in DOT are referred to those abilities, personal traits, and individual characteristics required of a worker in order to achieve average successful job performance.[15]

The worker trait components are:

1. Training time
2. Aptitudes
3. Interests

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[15] U.S. Department of Labor, Dictionary of Occupation Titles 3rd Edition, 1965. Volume Two (Washington, D.C. : Government Printing Office, 1966). P.651.

4. Temperaments

5. Physical demands

6. Working conditions

1. Training Time

The amount of general educational development and specific vocational preparation required for a worker to acquire the knowledge and abilities necessary for average performance in a job. It is divided into two parts: General Education Development (denoted as GED hereafter) and Specific Vocational Preparation (denoted as SVP hereafter).

GED is an indicator of levels of reasoning, Mathematical and language development required for average performance. It can be obtained from formal schooling or derived from experience or even independent study. It has six levels (level 1 to level 6). Explanation of these levels is attached in Appendix B.[16]

SVP is referred to the amount of time that is required to learn the skill to acquire knowledge and to develop the facility needed for average per-

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[16]For a detailed discussion of GED. See Ivar Berg, Education and Jobs: The Great Training Robbery. (Boston: Beacon Press, 1971). Chapter III. PP. 38-60 and Sidney A. Fine, "The Use of the Dictionary of Occupational Titles as a Source of Estimates of Educational and Training Requirements", The Journal of Human Resources. Vol. III, No.3 Summer/1968 PP. 365-367.

formance in a specific job-worker situation. This training may be acquired in vocational preparation school, vocational education, apprentice training, in-plant training, on-the-job training and essential experience in other job. There are 9 levels of ranking for SVP. It is ranked according to the time scale from short demonstration (level 1 to over 10 year (level 9).

Level	:	1,2	3	4	5	6	7	8-10
Time in months	:	less than 1	1-3	3-6	6-12	12-24	24-48	more than 48

2. Aptitudes

Aptitudes are the specific intelligence capacities and abilities required of an individual in order to learn or perform a task or job duty in a satisfactory way. They include the following items: verbal and numerical ability, clerical perception, motor coordination, etc. Levels of ranking are represented by digits. The digits indicate how many of each aptitude the job requires for average performance. The amount required is expressed in terms of equivalent amounts possessed by segments of the general working population. There are five scales ranking from Scale 1 (the top 10 percent of the population) to Scale 5 (the lowest 10 percent of the population).

3. Interests

Interests are the preferences for certain types of work activities or experiences, with accompanying rejection of contrary types of activities or experiences. Five pairs of interest are provided.

Both Aptitudes and Interests may be rather useful in understanding the requirement of an occupation, however, they are quite difficult to measure in quantitative terms. We are forced to exclude this two trait of components in our model.

4. Temperaments

It refers to different types of occupational situations to which workers must adjust. The items listed in DOT include:-

a. A variety of tasks that are often characterized by frequent changes.

b. Situation involving doing things under specific instruction; allowing little room for independent action.

c. Repetitive or short cycle operations carried out according to set prcedures or sequences.

d. The direction, control and planning of an entire activity or the activities of others.

e. The necessity of dealing with people in actual job duties beyond giving and receiving instructions.

Among these five items, we selected items b and c as indicators of a job characterized by a repetitive nature. Items d and e are, used to measure the nature of a job in which supervision of people is essential. These job characteristics variables are treated as dummy variables in regression to indicate the presence or absence of such particular characteristics in a DOT occupation.

5. Physical Demands

Physical demands are those physical activities required of the work in a job. The physical demands ratings in DOT may serve as a means of expressing both the physical requirements of a job and the physical capacities a worker must have to meet the requirements. For example, 'seeing' is a strict requirement for police constable and therefore the power of sight is a specific capacity possessed by many people. There are altogether six components within the title of physical demand. Only the following items are selected as indicators of job characteristics.

a. Sedentary work: lifting 10 lbs. maximum a job involving sitting most of the time, walking and standing are required only occasionally.

b. Light work : lifting 20 lbs. maximum, a job in this category requires walking or standing to a significant degree.

c. Medium work : lifting 50 lbs. maximum and/or carrying of objects up to 25 lbs. frequently.

d. Heavy work : lifting 100 lbs. maximum and/or carrying of objects up to 50 lb. frequently.

e. Very heavy work: lifting objects in excess of 100 lbs. and/or carrying of objects weighing 50 lbs. or more frequently.[17]

6. Working Conditions

Working conditions are the physical surroundings of a worker in a specific job. They indicate the environment embracing the following physical conditions:

a. Inside, outside or both

b. Extremes of Cold

c. Extremes of Heat

d. Wet and Humid

e. Hazards

f. Fumes, Odors, Toxic Conditions

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[17]For more detailed information on these definitions, see Appendix B.

Unfortunately, working conditions, though an important indicator of job characteristics, do not appear as a component in the Worker Traits Arrangement because they did not contribute to the homogenity of worker trait groups.

Luckily enough, however, in the Stanford Labor Survey, workers selected for interview were asked a question, "let us think of your working environment which includes where your factory is located, the safety measures which are in force and the appearance and cleanesss of your work area. Do you think that your work environment is better, worse or about average compared to that of others in a similar position outside".[18] If the response to this question is 'worse', it will take the value of 1 and 0 otherwise. This may alternatively be an indicator of an undesirable work environment faced by a worker.

7. Establishment Size

Finally, we think that the firm size may be another important indicator of job characteristics. Large firms in the manufacturing sector in Singapore are mainly those electrical and electronic factories, or chemical and petroleum factories. These factories are more capital-intensive in production. Ceteris paribus, the productivity

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[18] Question 49, Questionnaire Stanford Labor Survey. P.18.

of the worker in modern factories may be assumed to be higher than the small traditional family-run factories. If wage rate is paid according to marginal productivities as conventional economic theory suggests, workers in large factories are expected to receive higher monetary rewards than workers in small factories.

By experience of the Economic Research Centre, University of Singapore, a firm is defined to be large in our analysis if the number of its employees exceed or equal to 100. Among 133 companies selected for interview, only 38 companies are 'large firms' by this definition accounting for 28% of the total.

The job characteristics described above will serve as the job characteristics variables in our model. The original data are either ordinal or dummy variables, but all are treated in the latter form in this study.

III SPECIFICATION AND ESTIMATION

A. Model One

The first model is specified as follows. It is a multiple regression model with both continuous and dummy variables:-

$$\hat{\omega}_i^a = \beta_0 + \sum_{j=1}^{6} \alpha_i P_{ji} + \sum_{k=1}^{8} \beta_i Q_{ki} + e^a$$

$\hat{\omega}_i^a$ = hourly earnings of worker a in occupation i

β_0 = constant term

α , β = parameters to be estimated

P_{ji} = independent variables of personal characteristics, continuous or dummy

j = 1 actual years of work experience

= 2 work experience squared

= 3 schooling

= 4 Chinese dummy

= 5 Malays dummy

= 6 European dummy

Q_{kj} = holding a job i with k

k = 1 GED

= 2 SVP

= 3 Supervision

= 4 Non-sedentary

= 5 Repetitive

= 6 Physical Demand

= 7 Working Condition

= 8 Firm Size

e^a = random, unobserved stochastic disturbances term

The dependent variable hourly wage rate (w) is entered in logarithm form (the logarithm of earnings follows the normal distribution).[19] It includes gross salary, overtime and cost of living adjustments before taxation. Income obtained from other job, however, is excluded.

1. Personal Characteristics Variables

The personal characteristics variables include

(a) work experience

(b) work experience squared

(c) educational attainment and

(d) ethnic groups

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[19] For a note on the presentation of logarithm earnings, see Jacob Mincer. Schooling, Experience and Earnings, NBER, (New York: Columbia University Press, 1974). Atkinson, P.97 op. cit.

Age was also included as an independent variable in preliminary regression but it soon became evident that it is highly correlated with work experience (the co-variance is close to 0.95). Furthermore, as Jacob Mincer suggested, age itself is negatively correlated with length of education.[20] As a result, we decided to discard age and in favour of actual years of work experience because experience was shown to be a much more powerful determinant of earnings than age.[21] We further inserted work experience squared as a test of non-linearity of work experience.

Ethnic groups in Singapore can be classified into four main groups, Chinese, Malay, Indian and European. Table 13 is a summary of the ethnic groups of the selected workers:-

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[20] Jacob Mincer, op. cit. P.80

[21] For a interesting debate of the specification problem of age and experience, see Alan S. Blinder, "Wage Discrimination: Reduced Form and Structural Estimates". Journal of Human Resources. Fall/1973 Mark Rosenweig and Jack Morgan, "An Exchange: On the appropriate specification of Human Capital Models." Journal of Human Resources. No. 1, 1976 and Alan Blinder "On Dogmation in Human Capital Theory" Journal of Human Resources, No. 1, 1976.

TABLE 13

Profile of Ethnic Groups

		No. of case	%
Chinese	- Both Father & Mother	1032	82
	- Only Father & Mother	3	0.002
Malay	- Both Father & Mother	127	10
	- Only Father & Mother	5	0.004
Indian	- Both Father & Mother	52	4
	- Only Father & Mother	4	0.003
European	- Both Father & Mother	21	2
	- Only Father & Mother	1	0.001

The set of ethnic groups are measured by means of dummy variables. In order to avoid the possibility of producing a linear dependence in the data matrix, we have to drop one dummy variable.[22] Among the four race groups, Indian was dropped from the regression model.

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[22] See J. Johnston, Econometric Methods, second edition (Tokyo: McGraw-Hill, Kogakusha, 1972). P.180.

2. Job Characteristics Variables

(a) General educational development (GED)

(b) Specific vocational preparation (SVP)

(c) Supervising a group of worker

(d) Non-sedentary

(e) Repetitive or shor-cycle operation

(f) Physical Demand

(g) Undesirable work environment

(h) Firm Size

The first variable refers to a job that required higher GED levels. By 'Higher', we refer to level 4 and above in DOT Classification of traits arrangement. Level 4 is approximately equal to high school completion level. As DOT is based on United States samples, minor adjustments have been made in certain job categories in order to make it closer to the reality of the Singapore economy. These adjustments are based on a survey of the firms in the Singapore carried out at the same time as the Stanford Labor Survey. Job categories which require a higher GED will take a value of 1 and 0 if otherwise.

SVP refers to vocational training for more than one month. Short demonstration and orientation or vocational training which are less than one month are not counted. SVP is also treated in dummy form. As a comparison to DOT rating we ran our model by using a new set of SVP in which the input data of SVP are computed on the information obtained by Stanford Labor Survey. The coefficients of the regressions were found to be more or less the same as the DOT classification. It shows that to a certain extent the DOT worker trait arrangements can be applied to the economy of Singapore without loss of generality.

Variable c, d, e, f, g and h are computed in the same way as above. Jobs with a sedentary characteristic take a value of 0 and 1 if otherwise. Physical demand refers to a characteristic of jobs in which lifting of objects weighing 25 lb. or above is required. "Supervise" and "Repetitive" job characteristics are defined as outlined in previous sections. All the job characteristic variables are treated as dummy variables. Table 14 shows the distribution of the selected job characteristics. We did not, however, include, union membership in our

TABLE 14

DESCRIPTIVE STATISTICS FOR JOB CHARACTERISTICS VARIABLES

Variables	Absolute Frequency (Dummy) = 0	= 1	Mean	Standard Dev.	Variance	Observation
:D	760	487	0.391	0.488	0.238	1247
'P	439	808	0.648	0.478	0.228	1247
'PERVISE	911	336	0.269	0.444	0.197	1247
'N-SEDENTARY	340	907	0.727	0.446	0.199	1247
:PETITIVE	760	487	0.391	0.488	0.238	1247
'YSICAL DEMAND	373	874	0.701	0.458	0.210	1247
'RK 'VIRONMENT	1074	173	0.139	0.346	0.120	1247
'RM SIZE	540	707	0.567	0.496	0.246	1247

equation as labor unions in Singapore are not effective and are controlled by government authority. Union membership has very little influence on worker's wage. This is worth mentioning as it is quite a contrast to other empirical studies.[23]

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[23]For example, Robert Lucas found that union membership had a very substantial effect on wage holding job attributes constant. See Lucas (1977) op. cit. and also H.G. Lewis, Union and Relative Wages in the United States. (Chicago: University of Chicago Press 1963).

IV ESTIMATION RESULTS

Estimation of the equation was performed by cross-sectional multiple regression in the first stage. We ran 9 regressions eliminating a job characteristics variable at a time in an attempt to find the best statistical explanation of the equation. In each case we estimated the equation first by stepwise regression[22] and then by multiple regression. The programs used are catalogued in the Statistical Package for the Social Science (SPSS).

The results of the estimated coefficients with their standard error in parentheses beneath are given in Table 15. The coefficients are quite consistent in all 9 regressions. Some 60% of the total variation are explained in each equation.

The coefficient of work experience has a positive sign as expected. An additional year of work experience would increase earnings by around 5%. We have run the model while the work experience variables is controlled and found that the coefficients of other explanatory

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[22] Stepwise regression is described as a method of entering variables successively in all possible order until the F-test of the variables are insufficient for further computation. See A.S. Goldberger, Econometric Theory. (New York: John Wiley & Sons, 1964). Goldberger used the name of Stagewise instead of Stepwise.

TABLE 15

HEDONIC WAGE REGRESSIONS

Regressions / Indep. Variables	1	2	3	4	5
ORKYR^2	0.0535* (0.0031)	0.0547* (0.0031)	0.0536* (0.0033)	0.0539* (0.0032)	0.0542* (0.0032)
ORKYR^2	-0.0009* (0.0001)	-0.0009* (0.0001)	-0.0009* (0.0001)	-0.0009* (0.0001)	-0.0009* (0.0001)
SCHOOLING	0.0623* (0.0041)	0.0633* (0.0041)	0.0704** (0.0042)	0.0667* (0.0041)	0.0636* (0.0041)
CHINESE	-0.1578 (0.1390)	-0.1401 (0.1378)	-0.1828 (0.1448)	-0.1649 (0.1398)	-0.1447 (0.1392)
CLAYS	-0.2435* (0.1414)	-0.2313* (0.1402)	-0.2443* (0.1473)	-0.2737* (0.1421)	-0.2496* (0.1415)
EUROPEAN	0.6783* (0.1821)	0.6629* (0.1805)	0.6818* (0.1897)	0.6591* (0.1833)	0.6890* (0.1823)
ED	-	-0.1766* (0.0375)	0.0638* (0.0326)	-0.1463* (0.0378)	-0.1386* (0.0371)
EP	0.0222 (0.0321)	-	0.0489 (0.0333)	-0.1112* (0.0277)	0.0799* (0.0289)
EPERVISE	0.3555* (0.0341)	0.4645* (0.0406)	-	0.4782* (0.0414)	0.5112* (0.0400)
ON-SEDENTARY	-0.2336* (0.0427)	-0.2670* (0.0365)	-0.2890* (0.0448)	-	-0.1748* (0.0394)
EPETITIVE	-0.1225* (0.0306)	-0.1564* (0.0278)	-0.2361* (0.0315)	-0.0758* (0.0287)	-
HYSICAL DEMAND	-0.1069* (0.0357)	-0.1412* (0.0348)	-0.1404* (0.0382)	-0.2664* (0.0308)	-0.1464* (0.0367)
ORK ENVIRONMENT	-0.0069 (0.0318)	-0.0184 (0.0316)	-0.0025 (0.0332)	-0.0210 (0.0321)	-0.0145 (0.0319)
IRM SIZE	0.0552* (0.0221)	0.0522* (0.0219)	0.0606* (0.0230)	0.0572* (0.0222)	0.0532* (0.0221)
ONSTANT	-3.6782	-3.5929	-3.5845	-3.8148	-3.7935
	0.6269	0.6333	0.5953	0.6224	0.6262
O. OF CASE	1247	1247	1247	1247	1247

* significant at 5% level.

TABLE 15

HEDONIC WAGE REGRESSIONS

Regressions / Indep. Variables	6	7	8	9
$WORKYR^2$	0.0546* (0.0031)	0.0546* (0.0031)	0.0546* (0.0031)	0.0546* (0.0031)
$WORKYR^2$	-0.0009* (0.0001)	-0.0009* (0.0001)	-0.0009* (0.0001)	-0.0009* (0.0001)
SCHOOLING	0.0659* (0.0041)	0.0631* (0.0041)	0.0631* (0.0041)	0.0632* (0.0041)
CHINESE	-0.1296 (0.1387)	-0.1396 (0.1379)	-0.1366 (0.1381)	-0.1402 (0.1379)
MALAYS	-0.2125* (0.1410)	-0.2291* (0.1402)	-0.2282* (0.1405)	-0.2308* (0.1403)
EUROPEAN	0.6836* (0.1817)	0.6668* (0.1806)	0.6791* (0.1809)	0.6643* (0.1807)
GED	-0.1421* (0.0368)	-0.1740* (0.0375)	-0.1783* (0.0376)	-0.1756* (0.0376)
SVP	-0.0261 (0.0307)	0.0117 (0.0318)	0.0115 (0.0319)	0.0110 (0.0319)
SUPERVISE	0.4612* (0.0411)	0.4620* (0.0408)	0.4663* (0.0409)	0.4630* (0.0409)
NON-SEDENTARY	-0.3529* (0.0359)	-0.2597* (0.0427)	-0.2631* (0.0428)	-0.2593* (0.0427)
REPETITIVE	-0.1527* (0.0311)	-0.1527* (0.0309)	-0.1523* (0.0310)	-0.1516* (0.0309)
PHYSICAL DEMAND	-	-0.1452* (0.0364)	-0.1470* (0.0364)	-0.1449* (0.0364)
WORK ENVIRONMENT	-0.0200 (0.0318)	-	-0.0218 (0.0317)	-0.0180 (0.0316)
FIRM SIZE	0.0542* (0.0221)	0.0528* (0.0219)	-	0.0521* (0.0219)
CONSTANT	-3.6583	-3.6074	-3.5714	-3.6037
R^2	0.6287	0.6333	0.6317	0.6334
NO. OF CASE	1247	1247	1247	1247

* significant at 5% level.

variables did not change dramatically. The result is attached in appendix D.

Schooling is still the most powerful determinant among the independent variables. Its F-statistics are the biggest. An additional year of schooling will improve an individual's income by around 6%. In terms of ethnic groups both Chinese and Malays have negative signs indicating there are some forms of racial discrimination in the manufacturing sector of Singapore. Malays are in the most disadvantageous position as their negative coefficient is twice as large as that of Chinese. Most of the Malays and Indians selected in the survey were working in lower level jobs. Only two workers are in the higher level occupations.[23] It is not surprising, however, in a society when Chinese is dominant ethnic groups both in management side and worker side. European, on the contrast, has a substantial positive effect on wages. This phenomenon may be explained by the fact that European workers are mostly employed on expatriate terms with much higher wage rate.

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[23] A detailed discussion of this phenomenon will be found in a later section.

Among the job characteristics determinants, supervision is the most powerful determinant of wage. An individual worker improves some 40 -51 percent upon assignment to a supervisory job. In a similar empirical study Robert Lucas only found that white males improved 15 to 20 percent by assignment to supervisory job using 1967 population sample in the United States[24] whereas women of both races even tended to lose. It is a reflection of the industrial wage structure in Singapore which is quite different from that of the United States.

This trend of wage differentials is often observed between newly developing country and developed country. As suggested by Kuznets, it may be explained by means of availability and efficiency supply of high-skill labor. High skill labor because of training and responsibility, needs a substantial minimum income to enable the participant to pursue his activity effectively and to attract an adequate supply of new entrants. A highly qualified professionals, manager and work supervisor cannot operate efficiently on an income that might be sufficient for an unskilled

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[24]Robert Lucas (1977) op. cit. P.555

manual worker. The income must provide compensation for his past investment in education, without which an adequate flow into his occupation would not be assured. Simon Kuzuets further proposed that the minimum of real income for high level occupation are higher multiples of the low per capita income of the developing countries than of the high per capita income of the developed countries.[25] He cited an example that the minimum for a high level professional occupations in 1958 is $8000 for a family of four, or $2000 per head in the United States. This is a multiple of 0.96 of the per capita personal income of U.S. ($2092), but six times as high in India. In the case of Singapore the mean salary of a supervisor is as twice as a production worker. A larger coefficient of supervison variables may reflect that the wage differential of production worker and work supervisor is relatively smaller in U.S. but substantially larger in Singapore.

Specific vocational preparation has only an insignificant coefficient. It improves wage by only 1%. It is a little bit surprising though it is consistent with some prior findings, such as that of James Scoville. He also failed to discover any significant relationship between

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[25] See Simon Kuznuts, Economic Growth and Structure (New York: W.W. Norton & Company, 1965) and his 'Quantitative Aspects of Economic Growth of Nation,' Economic Development and Cultural Change. July/1956, April/1959 and 1963.

occupational wage and specific vocational preparation.[26]

Generally speaking, it is often found in both developed and developing countries that the economic returns to vocational schooling are quite low.[27] Herbert Gintis offered an explanation to this effect. He said the reason for the low economic-returns of vocational schooling was because of its "misplaced emphasis on the 'skill content' of schooling, and a corresponding under-emphasis on the broader socialization function involving the generation of a disciplined, obedient, and well-motivated work-force".[28] Gintis strongly suggested that the noncognitive personality characteristics generated through schooling have direct bearing on worker earning and productivity. However, the vocational education only emphasized its goal on technical skills and placed little emphasis on 'socialization' function. As a result, their returns are relatively low.

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[26] James G. Scoville, The Job Content of the U.S. Economy 1940 - 1970, New York 1970

[27] For a more comprehensive study, see Donald E. Super and John O. Crities, Apprasing Vocational Fitness, Second Edition. (New Yor: Harper & Row, 1962).

[28] Herbert Gintis, 'Education, Technology, and the Characteristics of Worker Productivity' American Economic Review, May/1971. P.267.

The coefficient of establishment size determinant also has a positive sign indicating that workers in large firms receive higher wage in comparison to small factories (about 5% more). Besides the productivity problem mentioned before, large firms pay more may be viewed as compensatory payment. Labor economists have maintained that workers' taste are not random with respect to establishment size but are more heavily distributed in favour of small plants.[29] A lot of behavior scientists suggested that the set of labour relations in small plants are more favourable than that in large plants since the chain of communication between workers and their supervisor are more direct and informal.[30] Workers in small plant thus enjoy greater discretion and personal contact with each other. This kind of job fulfillment may be viewed as some kind of psychic rewards. If it is true, an equalization of the different wage rates should emerge. Firms with large establishments should pay higher wage than small firms. This offers some supports to Adam Smith notion of equalizing differences.

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[29] Sherwin Roson, op. cit.

[30] See, for example, Leonard Sayles, Behavior of Industrial Work Groups (New York: John Wily & Sons, Mc. 1958). Robert Dubin, Human Relation in Administration, Third Edition, 1968.

Non-sedentary jobs are those requiring more physical exertion. The undertaking of such jobs, though distasteful, is not rewarded as the coefficients are negative in sign. The coefficient is around - 0.25, this value is quite near to the results obtained by Robert Lucas.[31] An explanation of the negative sign may be due to the omission of some skills and abilities associated with sedentary job holders. In the absence of direct and indirect measurements of innate ability, it is quite difficult at the present stage to obtain an acceptable explanation on the comparative advantage in the performance of sedentary and nonsedentary jobs.[32]

The factor of physical demand which is associated with heavier jobs[33] also has a negative sign suggesting a disadvantageous position in earnings. It may be explained by the same reason as nonsedentary job characteristics.

The performance of tasks involving repetitive work and undesirable work environment are also not rewarded in

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[31] Robert Lucas, 1977 op. cit. P.555, he found that the coefficient of white male workers in SEO population with less than eight years of schooling to be -0.26. SED refers to Survey of Economic Opportunity conducted in Spring, 1967 by office of Economic Opportunity, U.S. Government.

[32] See Michael Sattinger, "Comparative Advantage and the Distribution of Earnings and Abilities" Econometrica 43, May/1975, and also his "Comparative Advantage in Individuals" Review of Economics and Statistics No.2 May/1978.

[33] Carrying of objects up to 50 lbs. See Appendix A.

monetary terms. The frequency of giving an affirmative answer to the question on working conditions[34] is 173 workers, about 14% of the total.

Workers holding job demanding high levels of general educational development fail to receive higher wage. It is indeed out of expectation. It shows a changing trend in the relation between education requirement and employment pattern. The rate of change in educational achievements may out distance the change in educational requirements. In other words, in case of the supply of educated labor exceeds the demand for it, the entrance requirement of some occupation would be "educationally upgraded".[35] The education system in Singapore has been developing rapidly. In 1974, it produces about 180,000 secondary school graduates and about 380,000 primary school graduates. Most of the secondary school graduates are pouring into the labor market and are mostly absorbed into clerical jobs. The

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[34] Stanford Labor Survey

[35] John Folger and Charles Nam have found that the association of education and occupation (measured by a coefficient, Gramma) has been moderate but is declining. The Gramma = 0.50 in 1950 and 0.39 in 1960, in Education of the American Population, 1960 censers Monograph, quoted in Ivar Berg, op.cit. P.66.

over-supply of educated labors are not without its price. The upgrading of educational requirements will eventually decrease the relative price of secondary school labor. Blue collar jobs will be paid higher than the white collar jobs. As a result, those jobs which require GED at level 4 or above tend to have a negative sign. Table 16 tabulated the preferred educational requirement by skill category and firm size in Singapore.

A further attempt has been made to consider the hedonic wage equation at different point in age. We divided the selected workers into three age groups:

I. Age less than or equal to 25 years old. (denoted as Youngage hereafter)

II. Age between 26 and 45 years old. (denoted as Middle-age hereafter)

III. Age greater than or equal to 46 years old. (denoted as oldage hereafter).

The regression results of these three age groups are tabulated in Table 17.

TABLE 16

PREFERRED EDUCATIONAL QUALIFICATION BY FIRM SIZE AND JOB CATEGORY

Firm Size	Large Firm					Small Firm				
Preferred Educational Qualification (in %)	PRI	S.SEC.	SEC	UNIV	NO-P	PRI	S.SEC	SEC	UNIV	NO-P
High-level Manager	5.1	12	38.7	37	7.2	0.9	3.5	9.7	84.5	0.9
White Collar	0.8	18	74	2.2	5.0	2.0	2.0	88.0	4.0	4.0
Supervisor	5.7	18.5	54.7	9.1	12	10.2	10.2	59.0	7.7	12.8
Technical Worker	6.2	31.3	45.9	-	16.6	-	14.3	50.0	35.7	-
Production Worker	63.9	6.8	-	-	29.3	69.6	13.0	-	-	17.4

Source: Survey of Manufacturing Firms, University of Singapore, 1974.

Abbreviation: PRI: Primary Education S.SEC: Some Secondary Education
SEC: Secondary Education UNIV: University Education
NO-P: No Preference

TABLE 17

HEDONIC WAGE REGRESSION BY AGE

	AGE LE 25	AGE 26 - 45	AGE GT 46
WORKYR	0.0789 *	0.0101	0.0207
	(0.0108)	(0.0120)	(0.0347)
$WORKYR^2$	-0.0027 *	0.0001	-0.0003
	(0.0007)	(0.0003)	(0.0005)
SCHOOL	0.0472 *	0.0629 *	0.0402 *
	(0.0065)	(0.0060)	(0.0152)
CHINESE	0.0351	-0.3373 *	-0.1493
	(0.0374)	(0.2045)	(0.3295)
MALAY	-	-0.4270 *	-0.2369
		(0.2090)	(0.3387)
EUROPEAN	-0.0327	0.6837 *	0.3958
	(0.2834)	(0.2568)	(0.4957)
GED	0.0160	-0.0932 *	-0.0203
	(0.0441)	(0.0546)	(0.1340)
SVP	0.0501	0.0606	0.0567
	(0.0463)	(0.0547)	(0.1399)
SUPERVISE	0.3650 *	0.3861 *	0.1432
	(0.0520)	(0.0515)	(0.1263)
NON-SEDENTARY	-0.1520 *	-0.2188 *	-0.3799 *
	(0.0536)	(0.0673)	(0.2333)
REPETITIVE	-0.0745 *	-0.1761 *	-0.1101
	(0.0406)	(0.0488)	(0.1225)
PHYSICAL DEMAND	-0.0383	-0.1313 *	-0.5313 *
	(0.0430)	(0.0607)	(0.2140)
WORK ENVIRONMENT	0.0820 *	-0.1014 *	-0.1407
	(0.0365)	(0.0486)	(0.1978)
FIRM SIZE	0.0423 *	0.0403	0.1908 *
	(0.0280)	(0.0337)	(0.0893)
CONSTANT	-4.0110	-3.0332	-2.7924
R^2	0.5086	0.6337	0.6449
# of cases	522	587	122

* significant at 5% level

- not used because of too few observations

First, let us consider the schooling variable, an additional year of schooling improves income by 4.7% at Younage and 4% at old age, but 6.3% at middle age. The trend of coefficients tends to be a upside down U-shape curve as shown in Figure 4.

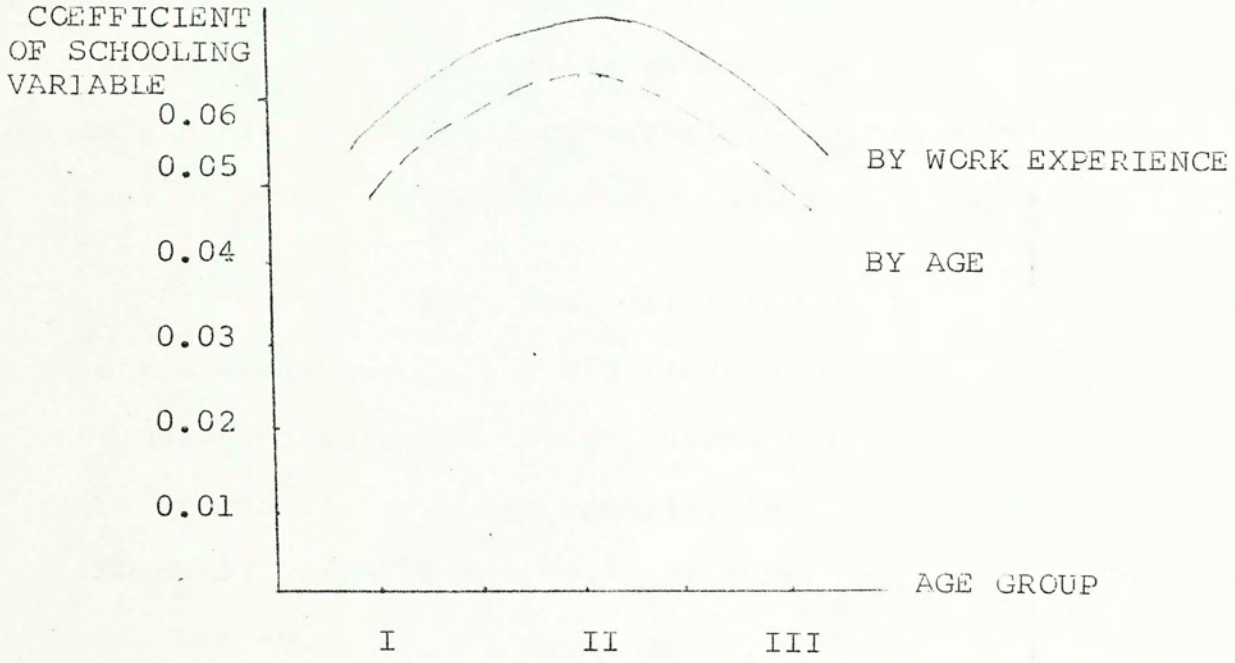

FIGURE 4

As a check, we have ran the hedonic wage equation once again by controlling the work experience into three groups:

I. less than 5-year work experience

II. with 6 to 10-year work experience

III. more than 11-year work experience

The results of the regression is shown in Appendix D. It is interesting to find out, though workers are not entered the labor force at same age, the trend of the work experience coefficients curve is nearly the same as age groups (see figure 4). It reflects, in terms of earnings over the life cycle, the schooling effect on earnings reached its peak at middle age while the lowest return at old age.

On the other hand, the trend of the job characteristics variables is quite different. The coefficients of most variables tended to become larger and larger with the growth of age. For example, the coefficients of NON-SEDENTARY variable are -0.15 at Youngage, -0.21 at Middle-age, but -0.38 at old age.

This growing trend may be explained by means of the schooling level attained within each age groups. Table 18 tabulates the mean and standard deviation of schooling level in each age group.

TABLE 18

SCHOOLING LEVEL BY AGE GROUP

AGE GROUP	SCHOOLING MEAN	STANDARD DEV.	NO. OF CASES
Less than 25	7.9211	2.6016	522
25 to 45	7.5366	3.9369	589
46 and above	4.9226	3.8258	122

In Table 18, it shows that younger workers receive more education than others and the older worker the less educated. If skill can be devired from education, then the skill possessed by the worker would be more within the youngage group and less in the oldage group. In other words, oldage groups are more lack of skill and hence their negative value the greater.

MODEL TWO

To find out the effects of different ethnic groups and levels of education on taste preferences, we ran another set of regressions in which the ethnic groups are controlled and separated into three categories: Chinese, Malays or Indian, and European, The levels of schooling are also divided into three groups:

a. 0-6 years of schooling, equivalent to primary school completion level.

b. 7-12 years of schooling, equivalent to secondary school completion level.

c. 13 years of schooling and above, including pre-university, college university and vocational institute education

The estimated coefficient, with their standard errors in parentheses beneath, are presented in Table 19.

Due to insufficient number of cases, Malays or Indians with 13 years of education and above (with 2 cases only), and European (with a total of only 25 cases) are excluded.

The results obtained open some new indications to us. Coefficients of Malays or Indians with lower education holding a job with repetitive nature and requiring physical demand are having a positive sign. It means that

TABLE 19

HEDONIC WAGE EQUATION BY EDUCATION AND RACE

	Chinese			Malays or Indian		
COOLING	0 - 6	7 - 12	13	0 - 6	7 - 12	13
KYR	0.0343* (0.0048)	0.0560* (0.0054)	0.0576* (0.0196)	0.0444* (0.0073)	0.0486* (0.0141)	-
;	-0.0006* (0.0001)	-0.0009* (0.0001)	-0.0010* (0.0005)	-0.0008* (0.0001)	-0.0007* (0.0004)	-
)	-0.1975* (0.0576)	-0.0527 (0.0570)	-	-0.2456 (0.2151)	-0.0953 (0.1488)	-
)	0.0859* (0.0449)	0.0794 (0.0563)	-	0.1253* (0.0802)	-0.1610 (0.1382)	-
ERVISE	0.4855* (0.0732)	0.4227* (0.0592)	1.5947* (0.7425)	0.1120 (0.2229)	0.2769* (0.1731)	-
N DENTARY	-0.2235* (0.0713)	-0.1450* (0.0691)	1.5207* (0.6017)	-0.3193 (0.2629)	-0.5870* (0.1709)	-
PETITIVE	-0.1266* (0.0468)	-0.0976* (0.0534)	2.0069* (1.0358)	0.0930 (0.0666)	-0.3662* (0.1306)	-
YSICAL MAND	-0.1047* (0.0596)	-0.2186* (0.0600)	-1.7526* (0.5855)	0.1721* (0.0870)	-0.1049 (0.1180)	-
DESIRABLE VIRONMENT	0.0114 (0.1527)	0.0135 (0.0444)	-0.0722 (0.1668)	-0.2949* (0.1133)	-0.0403 (0.1246)	-
RM SIZE	0.6586* (0.0330)	0.0715* (0.0343)	-0.0982 (0.1246)	-0.0829* (0.0547)	-0.0814 (0.0921)	-
NSTANT	-3.3705	-3.3897	-3.7825	-3.6474	-2.7355	-
	0.3338	0.5760	0.2619	0.3997	0.4877	-
. OF CASE	429	517	73	101	103	2

* - significant at 5% level

- not used because of too few observations

they received psychic wage in compensation to distasteful jobs.

Another interesting fact is that Chinese workers with higher education obtain compensatory wages for holding a job with repetitive nature. The coefficient is 2.0069 and significant at 5% level. Chinese workers with lower education, however obtained an opposite result. This result in terms of job satisfaction analysis, coincides with the finding of a study conducted by John Seybolt. He suggested a hypothesis as follows:

> "The individual with higher education will be less satisfied with his work when his work has low variety than the individual with less education will be with low variety".[36]

This hypothesis is supported. Seybolt found that in a sample of 3000 in United States, individuals with primary school education in jobs with low variety were significantly more satisfied with their work than were those with secondary school education in jobs with low variety, and they were also more satisfied than those with college education in jobs with low variety.[37]

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[36] John Seybolt, Job Satisfaction and Turnover in Work Organizations, unpublished Ph.D dissertation, Cornell University, 1975. P.48. A job of low variety is defined as a job involving the same things in the same way repeatedly.

[37] John Seybolt (1975) P.49 op. cit.

Following this reasoning, Chinese workers with higher education performing repetitive jobs would be more dissatisfied in terms of job fulfillment and therefore they had to be paid in monetary wages as a compensation and hence the coefficient is positive. It is substantially significant compared with other job characteristics variables.

Similarly, well-educated Chinese performing jobs of a nonsedentary nature are compensated substantially (the coefficient equals 1.5207, t = 2.5). If we compare Chinese workers of the three education levels, we will find the less educated workers are in the most disadvantageous position in performing distasteful job while the more educated labor, on the contrast, obtained substantial compensation wage. Table 20 shows these effects with t-values in the parentheses:-

TABLE 20

COEFFICIENTS OF DISTASTEFUL JOB CHARACTERISTICS OF CHINESE WORKERS

Schooling	0-6	7-12	Over 13
Non-sedentary	-0.2235 (3.1346)	-0.1450 (2.0984)	1.5207 (2.5273)
Repetitive	-0.1266 (2.7051)	-0.0976 (1.8277)	2.0069 (1.9375)

Personal characteristics, especially educational attainment therfore play a role in the determination of earnings. In terms of dual market theory, for instance, these characteristics influence a person's position in the labor queue and hence his prospects of obtaining employment in the primary sector. Workers in primary sector are normally well paid with low unemployment rate. The wage rates are tended to be more equalized in this sector, Therefore, if nonsedentary or repetitive job is required, ceteris paribus, employers had to pay more as compensation. On the otherhand, jobs are more or less alike in the secondary sector, workers are hired according to job ladder, the most distasteful job are hence always characterized by low pay and the coefficients are therefore negative.

Supervisory characteristic of jobs is once again a powerful determinant of the dependent variable, wages. Other coefficients are more or less the same as previous estimations. Only the signs of establishment size are a bit ambiguous.

MODEL THREE

In order to study the implication of job satisfaction further, we inserted three dummy variables into our model. In the Stanford Labor Survey, selected workers had been asked three questions:-

1. In terms of the number of working hours, would you be better off, worse off, or about the same as other people outside in a similar position. (denoted as HOURSAT)
2. In terms of work conditions, do you think that you are better off, worse off or about average? (work conditions referred to job security, chances of promotion and the kind of management and industrial relations). (denoted as WORKSAT 1)
3. Let us think of your working environment which includes where your factory is located, the safety measures which are in force and the appearance and cleaniness of your work area. Do you think that your work environment is better, worse or about average compared to that of others in a similar position outside.[38] (denoted as WORKSAT 2)

Workers who think they were better than others in a similar position outside would have a value of 1 and 0 if otherwise. We then inserted these three dummy variables into a set of equations run by both Stepwise and multiple regressions.

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[38] See Appendix A P.18.

The basic equation used is as follows:

$$\begin{aligned} LNWAGE = {} & \beta_0 + \beta_1 WORKYR + \beta_2 WORKYR^2 + \beta_3 SCHOOLING \\ & + \beta_4 CHINESE + \beta_5 MALAYS + \beta_6 EUROPEAN \\ & + \alpha_1 HOURSAT + \alpha_2 WORKSAT1 + \alpha_3 WORKSAT2 \\ & + \gamma_1 GED + \gamma_2 SVP + \gamma_3 SUPERVISE \\ & + \gamma_4 NON\text{-}SEDENTARY + \gamma_5 REPETITIVE \\ & + \gamma_6 PAY\text{-}DEMAND + \gamma_7 FIRM\ SIZE + \varepsilon \end{aligned}$$

Except WORKYR, $WORKYR^2$, and SCHOOLING variables all are treated as dummy variables. Regressions are first run on overall sample, and then controlled the occupational level into two groups: higher level and low level,[39] and finally controlled the race groups and schooling level. The results of estimation of the set of equations with the standard error in parentheses beneath are given in Appendix E.

The results of the new variables are, however, not very encouraging as the signs of the coefficients are not in a consistent manner and they are found not to be significant at 5% level. However, this result is not totally unexpected. Christopher Jencks also found that the inter-

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[39] A detailed job classification for high level and lower level is in Apprendix C.

relations between wage-job satisfaction and education-job satisfaction 'are surprisingly weak'.[40] Another more comprehensive national survey of job satisfaction conducted by Survey Research Center (SRC) at the University of Michigan in 1967 also found that job satisfaction had very little connection with either education and occupation prestige.[41]

Another explanation may be due to the fact that when a worker evaluated his situation with respect to these questions, he only compared his position with other jobs they had held and with jobs their friends have, not by comparing it with some hypothetical nations-wide sample. If this is true, Jencks suggested that the high level workers are much more unsatisfied than low level workers. As manager would compare themselves to other managerial class and the production workers would compare themselves to other production workers. As a result, unsuccessful managers would be more dissatisfied than production workers as wage differentials in lower level are comparatively

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[40] Christopher Jencks, Unequality: A Reassessment of the effect of Family and Schooling in America, (New York: Basic Books, Inc. Publishers, 1972.) P.247.

[41] The result of this survey was reported in Robert Quinn, Survey of Working Conditions. (Ann Arbor: SRC, University of Michigan, 1970.)

smaller. Our estimation at least supports this theory to certain extent. The coefficients in Appendix C is substantially greater for high level work and well-educated workers than lower level and less educated workers.

IV CONCLUDING REMARKS

The aim of this chapter is to test the feasibility of using multiple attribute approach with both personal characteristics and job characteristics as independent variables to analyse the problem of money wage and psychic wage in a developing country. The results we obtained, though not totally satisfactory, providing some evidence in supporting equalizing wage differentials.

It is first established the fact that supervisory jobs, ceteris paribus, do pay substantial higher wages, suggesting rewards to some omitted set of skills that are not fully reflected in the common schooling and experience variables. Although only one variable provided support to the notion of equalize wage differentials in over-all sample regression. Psychic wage soon came into the picture when the schooling level is controlled. We found that more educated workers, where skill is more equally distributed do receive higher money wages in compensation for undertaking jobs embracing repetitive routine and with more lifting and physical exertion. The coefficients of NONSEDENTARY and REPETITIVE are large and significant.

Our result is, however, restricted by the measure of job Characteristics variables of the DOT. It is not only due to DOT is based on U .S.background but also due to its rating method. As Fine and Seybolt pointed out, 'the rating themselves (DOT) are descriptions of "typical" occupational requirements, rather than requirements of specific jobs.'[42]

Finally our model is on the supply side[43] only and without any measurements of IQ[44] for the comparative advantage of individuals. Further research in these two aspects would be fruitful though the identification problem inherent in such exercise is far from trivial.[45]

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[42] John Seybolt (1975) op. cit P.38 and see also Fine, S. The 1965 edition of the DOT, Kalamazoo, Mich:Upjohn Institute, 1968.

[43] For a discussion of this aspect, see Sahota, 1978 op. cit. [44] P.16.

However, Griliches and Mason has produced substantive evidence suggesting that the upward bias in the contribution of investment in human capital, due to the omission of ability and opportunities is very low, practically zero. See Zvi Griches and W.M. Mason 'Education, Income and ability, Journal of Political Economy Vol. 80, 1972.

[45] Robert Lucas. op. cit.

CHAPTER FOUR

EARNINGS AND TASTE PREFERENCE

I. THEORETICAL CONSIDERATION

The relationship between occupation and earning can better be separated into two aspects: the effect of occupational choice on earnings and the differences in earnings within an occupation. The application of human capital theory in occupation choice have been well studied by labor economists. It has been recognised that in choosing among occupation,[1] a potential worker will balance the pecuniary advantages (earned income) and non-pecuniary (fringe benefit, promotion, etc.) and cost (cost of training, foregone earnings.)[2] An individual will invest in human capital in changing occupation only if the rates of return are large enough to make the choice the most profitable use of his limited resources.[3] Stated in other words, the choice among different occupations requiring

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[1] Workers in different occupations, are assumed to be not perfect substitutes.

[2] See Michael Boskin, "A Conditional Logit Model of Occupation Choice". Journal of Political Economy. Vol. 82, 1974 pp. 389-397.

[3] We assumed no perfect capital market in borrowing and lending for the creation of human capital.

more or less education attainment would depend on an individual's preference system as between present and future consumption.[4]

If we exclude the problem of cost, the choice among occupation will be determined by a balancing of pecuniary benefits against nonpecuniary benefits. The individual chooses the occupation that will generate in terms of utility, the greatest total of pecuniary and non-pecuniary advantages. Suppose that every occupation has a discounted lifetime pecuniary and non-pecuniary reward attached to it. An individual could, therefore, construct an opportunity locus such as EE Figure 1.

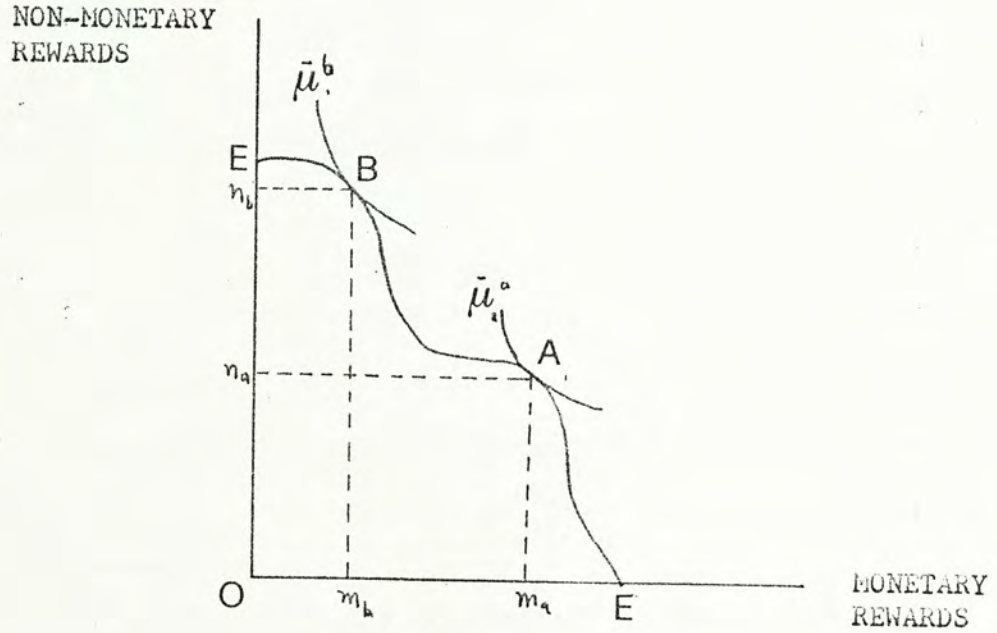

FIGURE 1

[4] See, for example, Gary Becker, Human Capital, (New York: National Bureau pf Economic Research, 1964) or Harry G. Johnson, Theory of Income Distribution. (London: Gray-Mills Publishing Ltd., 1973). Chapter 17.

An individual, a, would have a set of indifference curves such as U_1^a, U_2^a between pecuniary and non-pecuniary rewards. According to his taste and preference to an occupation, the individual a would weight the advantages and disadvantages of monetary and non-monetary rewards and select an occupation at point A which yields the greatest total of utility. On the other hand, suppose there is another person with the same opportunity curve but a different set of taste and preference. He would choose another point, such as B with different reward structure, on the opportunity curve. For these two persons, the difference in monetary earnings ($M_A - M_B$), would indicate the effect of both the taste preference and the trade-off of opportunities (monetary for non-monetary rewards) available. In a fundamental sense, this difference arises essentially because of variations in taste and preference.[5]

This line of reasoning suggested by Haspel[6] allows us to obtain an occupation demand function which depends on taste preferences and relative prices. While the non-pecuniary

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[5]Other factors which affect the trade-off include the location of work place, discriminatory behavior within a particular occupation, etc. See for example, Gary Becker, The Economics of Discrimination, (Chicago: Chicago University Press).

[6]In A. Haspel, Occupational Decision making: A Socioeconomic Analysis. unpublished doctoral dissertation. University of Pennsylvania, 1974. His result is summarized in Paul Taubman, Sources of Inequality in Earnings, (Amsterdam: North Holland Pub. Company, 1975) P.96.

ewards attached to an occupation are assumed to be the same for all workers, tastes[7] vary from person to person. The relative earnings in each occupation are obtained by inserting a person's characteristics into the estimated within occupation equations. If an individual receives certain percent more earnings than predicted in his actual occupation, he will receive the same percentage more in all other occupations. A person's occupational choice, therefore, depends at least in part, on the earnings available to him in all occupations which may be estimated from within occupation earnings equations.

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[7]Measured by some variables to be discussed in later section.

II ASSUMPTION AND METHODOLOGY

In this chapter, we will report the empirical results in which both the personal characteristics and taste preference variables are inserted in a log wage equation, the basic assumptions underlying the theoretical model are:

1. Workers are paid their marginal product.
2. Each job offers a vector of monetary and non-monetary rewards and that the particular combination chosen through an occupation (such as A in Figure 1) is partly depended on his preference function.
3. There are many different dimensions of preferences which are, however, not determined by heaven. They are partly produced by personal background, education and other factors.

MARGINAL PRODUCT THEORY AND NONPECUNIARY BENEFITS

The consideration of how to adjust the effect of nonpecuniary benefits in an earnings equation or rate of returns estimation is a very troublesome question and it is very much depended on whether one views it from the standpoint of personal profit or of national productivity. Professor Mark Blaug of University of London said: 'From the viewpoint of social policy, nonpecuniary alternatives can be dismissed as a neutral factor'[8] because he thought that the

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[8] M. Blaug, 'The Rate of Return on Investment in Education in Great Britain,' The Manchester School vol. 33, 1965, Reprinted in M. Blaug (ed.) Economics of Education, Vol. I. ELBS. P.231.

nonpecuniary rewards only affect the supply and not the demand for labor, and therefore, do not distort the relationship between earnings and a worker's productivity.

Furthermore ample evidence showed that the more educated people attach a higher than average value to the nonpecuniary aspects of work. And the higher the real income of a society, the greater the weight that the society as a whole is likely to put on the nonpecuniary side of work. Therefore the greater the nonpecuniary attractions of an occupation, the greater will the number of workers who will be willing to enter this occupation at a given wage rate and it will be the greater the possibility of the employer to hire a give number of workers at a lower wage rate. The extent of nonpecuniary attractions, therefore, will determine the position of the supply curve of labor though it does not affect the fact that the employer will still pay the money wage which will equal the value of the marginal product produced by the last worker hired.

THE MEASURE OF TASTE PREFERENCE

The measure of non-pecuniary taste preference are based on a ranking of preference listed by selected workers in the Stanford Labor Survey. The ranking includes ten factors that would influence a worker's occupational choice. These ten items are:

a. Earnings, prefer to be salaried
b. Security, no danger of being sacked
c. Prestige and Status
d. Full time work available
e. Not much work to do
f. Change of promotion
g. A feeling of accomplishment
h. Proximity to home
i. Friends and/or relatives in the firm or factory

Selected workers were asked to rank the ten factors from 1 to 10 in order of importance in their perception. This method is somewhat different from other similar studies[9] which are based on yes or no answers. The advantages of ranking rather than a choice between yes or no answers may be that the former avoids the problem of standardization. The responses of yes or no of different individuals are based

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[9] Paul Taubman, op.cit.

on different scales. A standardization procedure is normally required in order to obtain unbiased coefficients.

On the other hand, however, ranking method also has its shortcomings. Since respondents are requested to rank among ten factors. The reliability in their ranking is quite questionable. We should not assume that everyone is so intelligent as to list all the ten factors according to the order of his real preference in perception. For this reason, we decided to measure these factors in dummy variables, only those factors ranked as the most important (order 1) will take a value of 1 and 0 if otherwise.

We therefore conclude that, in a format sense, if the respondents thought like economists, the question 'job security' would distinguish between risk averters and risk lovers. In a less formal sense, people may be simply recording their belief that their occupation is risky and that they are risk-averse. It may be safe, however, to say that if the trade-off occurs along the opportunity curve a as shown in Figure 1, the order of ranking can reveal something about preferences even if interpreted in a formal framework.[10]

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[10] Paul Taubman, op. cit. P.164.

Another possible objection to interpret the taste preference variables may be the possibility that it may reflect the respondent's personal experience and some unobservable factors. An ambitious person who fails to obtain a senior post may say that he is interested in 'accomplishment' or 'Friend in the firm' as a reaction of his luck of career success. This kind of unobservable factor is never dealed with in economic literature. Readers should keep this in mind when interpreting the results as the preference variables are relatively new in economic research.

III ESTIMATION RESULTS

The empirical results are run by multiple regression and the estimation results with their standard errors in the parentheses beneath are given at the end of this chapter. In a view not to overburden the reader, we will report our result by three particular groups of variables: education, taste preference variables, and other factors. The dependent variable of the equation is the hourly wage rate in logarithm form with 36 determinant variables in which ten of them are measurement of taste preferences. The regression are run in disaggegated manner with four major occupation groups:

1. Managerial class: managers, high-level executives, accountants, middle level executives, administrators etc.
2. Professionals: engineers, chemists, pharmacists, programmers etc.
3. Production workers: work-area supervisors, foremen, quality control officers, technicians, fitters, skilled and semi-skilled production workers, operators etc.
4. Others: proprietors, clerks salesmen etc.

In terms of job categories, occupation group 1 belongs to job classifications[11] 2, 3, and 4. Occupation group 2 belongs to job classification 5, occupation group 3 belongs to job classifications 7, 8 and 9, and occupation group 4 belongs to job classifications 1 and 8. Job classification 10 is excluded as those jobs are of casual or temporary nature.

The results reported later on can be divided into between and within occupation effects - the effect of the variable on occupational choice and the effect on earnings within the particular occupation.

EDUCATION

A comparison across occupations indicate that the effect of education does vary by occupation and is generally the greatest for the production worker.

TABLE 21

EFFECTS OF EDUCATION WITHIN OCCUPATIONS

	Managerial	Professionals	Production Workers	Other
Primary	-0.1363	0.1291	0.0771*	0.7441*
Secondary	0.0516	-0.1031	0.1968*	-0.0846
University	0.1947	-1.9561	0.6905*	0.0418
Graduate	-0.2783	0.5106	-	0.0769

* significant at 5% level

\- not used because of too few observations

[11] For details, see Appendix C.

Production workers with primary school level improved their wage rate by about 8%, but 20% for secondary school graduates and 69% for university degree holders, while the coefficients for managerial post and professionals are not significant at 5% level. This phenomenon clearly indicates that Singapore, in her rapid pace to industrialization, generate increasing demand for manufacturing workers, technicians and supervisors trained in modern production and scientific skills.[12] There are a number of reasons for this scarcity of production workers. The development of education in Singapore is, to a greater extent, inherited from colonial days. It is typically concentrated on the humanities. Only very few schools are intensive in training factory workers. However, with the industrialization, part of the goals of education have been shifting to encourage students to enroll in technical skill and applied science recently. This is no wonder that in the regression result a degree in engineering is more profitable than a degree in arts or pure science.

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[12] See Theodore Geiger, op. cit. P.212.

NON-PECUNIARY PREFERENCES

In this chapter, we have laid great stress on variables we designated as variables indicating worker's taste preference on non-pecuniary aspects. The results of the regression are summarised in Table 22. Before interpreting the result, we must make the crucial pre-assumption that, in equilbrium, workers who like risky jobs will be doing risky jobs. The reason for this assumption is clear, wages are paid for jobs and not for people's tastes, therefore the worker's expectation must be assumed to be realized.[13]

Let us consider the occupational choice questions. Those prefer salary to others earn substantially more in professionals but not significantly in other occupations. The consistent negative signs of job security in all occupations indicates a trade-off between income stability to present earnings. Though the value is small, it supports the fact that job security, as a feasible non-pecuniary benefits, is used to trade off for monetary rewards.

Other important factors of non-pecuniary preference are chance of promotion and accomplishment. Those who prefer to have chance of promotion earn significantly more in terms

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[13] See P.G. Layard, in A.B. Atkinson, op.cit. P.215

TABLE 22

NONPECUNIARY TRADE-OFFS IN VARIOUS OCCUPATIONS

Preference	Managerial	Professionals	Production Worker	Other
Money	-0.0102	0.3529*	-0.0331	0.0878
Security	-0.0033	-0.0120	-0.0004	-0.0135*
Prestige	-	-0.0242	0.0066	0.4807*
Work	-0.0481	0.0286	-	0.2574*
Not much	-0.1511	0.0812	-0.1142*	-0.2631
Promote	0.1280*	0.2634*	-0.0054	0.2907*
Accomplishment	0.1343*	0.3681*	-0.0589*	0.3486*
Near home	0.1038	-0.3501	-0.1099*	0.1083
Friends	0.2325	1.1985*	0.0222	0.1123
No shift	-0.0671	0.1444	0.0086	0.0663

*significant at the 5% level.

- not used because of too few observations.

of earnings. The largest effects are found in the 'professionals' and 'other' groups where salary is improved by 26-30%. The managerial also has a positive sign. However, its effect is around 12% only. People interested in chance of promotion may initially choose a job in which there was some chance for higher income. If they succeed, and over time, the average earnings of the winners grows more than those who were risk averse and thus improved their earning. However, since success is not won overnight and by no means guaranteed, we should not assume the positive sign we obtained as a general rule.[14]

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[14] John Von Neumann and Oskar Morgenstern had developed a theory in this respect. He postulated a person based his decisions on the expected volume of utility of a set of outcomes defined as $\sum_j P_j U(A_j)$, where P_j is the probability of the A_j event occurring once $U(A_j)$ is its utility. If there are two alternatives A and B where A has only one possible outcome A_1 and B has a whole set but an average outcome B. Suppose A_1 equal B. Then, if a person has diminishing marginal utility, he would be more preferred to choose A. Alternatively, if his marginal utility exhabited increasing returns, he would be a risk lover and choose B. See Theory of Game and Economic Behavior. (Princeton: Princeton University Press, 1953)

Those interested in accomplishment earn substantially more than others. Again, the greatest effects are found in the 'professionals' and 'other' groups, improving salary about 35%.

Other preference variables, proximity to home. 'Friends or relatives in the firms' and 'no shift changes' failed to perform significant effects.

OTHER FACTORS

Other factors in the regression include

a. work experience: It is measured by the actual work experience accumulated after school.
b. work experience squared: To test for nonlinearity.
c. on-the-job training: It more than one month training provided, it takes the value of 1 and 0 otherwise.
d. hours: hours of work in a typical week
e. second job : Have a second job on regular basis.
f. absent: Measured by days that a worker absent from job for any reason other than vocation.

The result of regression is shown in Table 23.

TABLE 23

EFFECTS OF OTHER FACTION WITHIN OCCUPATION

	Managerial	Professionals	Production Worker	Other
Workyr	0.0380*	0.0708*	0.0356*	0.0672*
$Workyr^2$	-0.0005*	-0.0016*	-0.0006*	-0.0008*
On-the-job training	-	-0.1826	0.1312*	-0.3083*
Firm Size	0.2635*	0.0801	0.0606*	0.1022
Hours	-0.0035	-0.0226*	-0.0051*	-0.0185*
Secondjob	0.0081	0.2701	-0.0094	0.0163*
Absent	-0.0521	0.1361	0.0115	0.0097

* significant at 5% level

- not used because of too few observations

In terms of work experience, an additional year of work experience adds 3.8% to earnings of managerial worker, 7.1% to professionals, 3.6% to production workers and 6.7% to 'other' groups. The greatest value was again found in professionals. On-the-job training is significant at production worker group, it improves 13% of the earnings. It reflects that with on-the-job training, new skill may be generated. As production workers are, relatively speaking, more lack of skill than managerials and professionals. A worker who possesses new skill would accordingly be rewarded by monetary wage. On the other hand, as skill are more equally distributed in managerials and professionals, the effects of skill generated by on-the-job training on earnings are relatively small and therefore the coefficient are not significant.

Managers working in large firm has an advantage since their wage is improved by 26% while for production workers it is only 6%. Hours, second job, and absent from job did not have significant effects on earnings.

Table 24 is a descriptive statistics of all the variables used in the equation.

TABLE 24

DESCRIPTIVE STATISTICS FOR VARIABLES IN WITHIN-OCCUPATION REGRESSION

Variables	Absolute Frequency (Dummy) = 0	= 1	Mean	Standard Dev.	Variance	Observati
AN	1107	140	0.112	0.316	0.100	1247
ELLITE	953	294	0.236	0.425	0.180	1247
URB	668	579	0.464	0.499	0.249	1247
AL	1013	234	0.188	0.391	0.153	1247
NGLISH	1147	100	0.080	0.272	0.074	1247
ALAY	1099	148	0.119	0.324	0.105	1247
AMIL	1209	38	0.030	0.172	0.030	1247
HINESE	240	1007	0.808	0.394	0.156	1247
RIAGE	507	740	0.593	0.491	0.241	1247
OR HEALTH	1164	83	0.067	0.249	0.062	1247
IR HEALTH	1085	162	0.130	0.336	0.113	1247
OD HEALTH	359	888	0.712	0.453	0.205	1247
EL. HEALTH	921	326	0.261	0.440	0.193	1247
LE	553	694	0.557	0.497	0.247	1247
	834	413	0.331	0.471	0.222	1247
HELOR	1160	87	0.070	0.255	0.065	1247
STER	1240	7	0.006	0.075	0.006	1247
MANITIES MAJOR	1224	23	0.018	0.135	0.018	1247
IENCE MAJOR	1223	24	0.019	0.137	0.019	1247
GINE MAJOR	1206	41	0.033	0.178	0.032	1247
DICINE MAJOR	1245	2	0.002	0.040	0.002	1247
A. MAJOR	1238	9	0.007	0.085	0.007	1247
NEY	588	659	0.528	0.499	0.249	1247
CURITY	1041	206	0.165	0.370	0.137	1247
ESTIGE	1134	113	0.091	0.287	0.082	1247
K	975	272	0.218	0.413	0.171	1247
T MUCH	1205	42	0.034	0.180	0.033	1247
OMOTE	889	358	0.287	0.453	0.205	1247
COMPLISHMENT	958	289	0.232	0.422	0.178	1247
EAR HOME	1095	152	0.122	0.327	0.107	1247
RIENDS	1183	64	0.051	0.221	0.049	1247
OSHIFT	1136	111	0.089	0.285	0.081	1247
ALING	1043	204	0.164	0.370	0.137	1247
IRM SIZE	543	704	0.565	0.496	0.246	1247

PERSONAL CHARACTERISTICS AND TASTE PREFERENCE REGRESSION

Independent Variables	Managers		Executive		Professionals		Production Workers		Others	
PERSONAL CHARACTERISTICS	Coeff.	S. Err.	Coeff.	S. Err.	Coeff.	S. Err.	Coeff.	S. Err.	Coeff.	S. Err.
Satellite	0.0689	0.1651	0.1959	0.2995	0.0426	0.0296	0.1325	0.1863		
Surban	0.0198	0.1588	0.3098	0.2718	-	-	-0.0791	0.1526		
Rural	0.1287	0.1777	-	-	-0.0451	0.0308	0.2315	0.1954		
English	0.2774	0.1103	0.3056	0.2998	-0.0772	0.0761	-0.1465	0.1685		
Malay	-0.2888	0.1628	-	-	-0.3108	0.1017	-0.1398	0.2654		
Chinese	-0.2788	0.1165	-0.3343	0.2645	-0.1879	0.0994	-0.1597	0.2452		
Marriage	-0.1011	0.1294	0.0693	0.1690	0.1845	0.0329	0.4037	0.1653		
Health:										
Poor	-0.1938	0.0935	-0.1987	0.2656	0.4299	0.1339	0.2259	0.2255		
Good	-0.1356	0.1905	-1.0013	0.4734	0.4007	0.0521	-	-		
Excellent	0.0427	0.1887	-1.0652	0.4621	0.4099	0.0481	0.5471	0.3226		
EDUCATION										
PSLE	-0.1363	0.1018	0.1291	0.2087	0.0771	0.0288	0.7441	0.3047		
SC	0.0516	0.1003	-0.1031	0.3564	0.1968	0.0381	-0.0846	0.1188		
Bachelor	0.1947	0.2344	-1.9561	4.2844	0.6905	0.4226	0.0418	0.3269		
Master	-0.2783	0.3760	0.5106	0.5555	-	-	0.0769	0.3929		
Major:										
Art	0.1111	0.2380	2.3165	4.1906	0.2287	0.3462	0.0480	0.3656		
Science	0.0876	0.2399	1.7089	4.2784	-	-	0.6485	0.3781		
Engine	0.3192	0.2551	1.9654	4.2905	-	-	0.7739	0.4661		
Medicine	0.4278	0.5630	-	-	-	-	-	-		
B.A.	-0.1957	0.3459	-	-	-	-	0.7561	0.4251		
TASTE FACTOR										
Money	-0.0102	0.0973	0.3529	0.2284	0.0331	0.0304	0.0878	0.1480		
Security	-0.0033	0.0060	-0.0120	0.0241	-0.0004	0.0021	-0.0135	0.0070		
Prestige	-	-	-0.0242	0.2787	0.0066	0.0058	0.4807	0.1606		
Work	-0.0481	0.1468	0.0286	0.4383	-	-	0.2574	0.1636		
Not much	-0.1511	0.2911	-0.0812	0.7394	-0.1142	0.0660	-0.2631	0.2705		
Promote	0.1280	0.0954	0.2634	0.1801	-0.0054	0.0326	0.2907	0.1581		
Accomplishment	0.1343	0.0973	0.3681	0.2528	-0.0589	0.0401	0.3486	0.1491		
Near home	0.1038	0.1800	-0.3502	0.3917	-0.1099	0.0377	0.1083	0.1783		
Friends	0.2325	0.3384	1.1985	0.7261	0.0222	0.0536	0.1123	0.2307		
No shift	-0.0671	0.2478	0.1444	0.4011	0.0086	0.0410	-0.0663	0.2481		
On-the-job training	-	-	-0.1826	0.2429	0.1312	0.0333	-0.3083	0.1887		
Establishment Size	0.2635	0.0820	0.0801	0.1424	0.0606	0.0247	0.1022	0.1043		
OTHER FACTORS										
Workyr	0.0380	0.0153	0.0708	0.0277	0.0356	0.0043	0.0672	0.0179		
$Workyr^2$	-0.0005	0.0003	-0.0016	0.0008	-0.0006	0.0001	-0.0008	0.0003		
Hours	-0.0035	0.0050	-0.0226	0.0131	-0.0056	0.0012	-0.0185	0.0049		
Second job	0.0081	0.0153	-0.2701	0.2002	-0.0094	0.0073	0.0163	0.0074		
Absent	-0.0521	0.0691	0.1361	0.2998	0.0115	0.0080	0.0097	0.0188		
Constant	-1.9813		-0.5943		-3.6331		-4.0016			
R^2	0.4483		0.7584		0.4069		0.6634			

CHAPTER FIVE

NONPECUNIARY BENEFITS AND EARNING

I INTRODUCTION

The introducing of nonpecuniary beneifts as well as pecuniary benefits may help in explaining the income differentials. In previous chapters, we first inserted job characteristics into wage equation and found that psychic wage did exist, to certain extent, in the manufacturing sector of Singapore. Then, in chapter four, we measured the taste preference of nonpecuniary benefits and discussed the trade-off between pecuniary and non-pecuniary benefits along a worker's job opportunity set. If this is an acceptable theory. Then, past empirical studies of earnings functions using only pecuniary benefits measures as dependent variables would either under- or over-estimate the real effect of the determinants.[1]

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[1] There are a few empirical studies that tried to relate the nonpecuniary aspects to pecuniary aspect. See Lester Thurow and Robert Lucas, The American Distribution of Income. Joint Economic Committee, Washington, B.C. U.S. Government Printing Office, 1972. Joseph Autos and Sherwin Rosen," Discrimination in the market for Public School Teachers." Journal of Econometrics 3,1975. Greg J. Duncan, "Earning Function and Non-Pecuniary Benefits". The Journal of Human Resources Vol. XI. 4,1976.

As Samuel Bowles and other scholars observed, rich, high status and well-educated individuals would place a larger value on the nonpecuniary benefits of work and a lower value on monetary returns than the poor, low status and less-educated workers.[2] Generally speaking, it is fair to say that high income groups would be more willing to trade off monetary rewards for non-monetary rewards. The low income groups, on the other hand, would place more value on monetary income as their income may be too low to afford a trade-off for non-monetary benefits. Therefore, if nonpecuniary benefits are added into the earnings functions, it may change the coefficients of the determinants. The effect of this change will depend upon the ways in which these determinants themselves relate to the nonpecuniary earnings.

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[2] Samuel Bowles, "Schooling and Inequity from Generation to Generation." Journal of Political Economy (80) May/June 1972. See also Burhard Strumpel, "High Education and Economic Behaviour". In S.B. Withey (ed.), A Degree and What Else. New York: McGraw-Hill Book Company, 1975.

II A Simple Theory on Pecuniary Benefits, Non-Pecuniary Benefits, and Earnings Function

First, let us consider the problem of pecuniary and non-pecuniary benefits in a labor market setting, we assume there are pecuniary and non-pecuniary benefits from a job. Suppose the non-pecuniary returns are denoted by NP_j where j indicates an occupation.

Suppose, that occupation 0 has no nonpecuniary rewards. We would expect, in a competitive labor market:[3]

$$W_o = W_1 + kNP_1$$

where W is the wage rate.

If the market is in equilibrium, then those workers who prefer nonpecuniary to pecuniary benefits will be more likely to choose occupation 1 and to have lower earnings, the difference is $W_o - W_1$, ceteris paribus.

In the micro level, suppose the pecuniary benefits and the nonpecuniary benefits are related to earnings in the following ways:-

$$W = B_{10} + B_{11} X_1 + \cdots + B_{1N} X_N + U_1 \cdots \quad (1)$$

$$NP = B_{20} + B_{21} X_1 + \cdots + B_{2N} X_N + U_2 \cdots \quad (2)$$

---

[3] We assume that the two occupations, 0 and 1 require equal wages for supply and demand to be equilibrated in both market.

where W is the wage rate, NP is the measure of nonpecuniary rewards, X_1 to X_N are a set of earnings determinants. U_1 and U_2 are stochastic error terms. We further suppose the total earnings are an additive function of both pecuniary and nonpecuniary rewards.

$$E = W + k_1 NP$$

where E is the total earnings and the value of k_1 will depend upon the share of W and NP and the way they are sealed. By substitution,

$$E = (B_{10} + k_1 B_{20}) + (B_{11} + k_1 B_{21}) X_1 + \ldots\ldots + (B_{1N} + k_1 B_{2N}) X_N + (U_1 + k_1 U_2) \ldots\ldots (3)$$

With this formula, it is easy to specify two conditions to check the relationship between the nonpecuniary and the earnings functions.

1. if $B_{21} \neq 0$, there will be a linear relationship between X_1 and the level of nonpecuniary benefits. If there is a positive relationship, then the coefficients estimated by earnings equation (1) will understate its importance in the total earning. On the other hand, if they have a negative relationship, then its importance is overstated.[4]

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[4] See Greg J. Duncan, op. cit. P.465

2. $k_1 \neq 0$, the larger the value of k_1, the more understated will be the importance of an independent variable that has a positive correlation with nonpecuniary benefits. Testing for bias will involve estimating equation (2) for each of the available nonpecuniary measures.

In the next section, we will try to estimate the relationship between pecuniary and nonpecuniary benefits. We basically follow Mincer's schooling model, using education, experience, experience squared as the main independent variables. The race factors are also included as determinants.

The weighted additives are obtained by the alternative method of canonical correlation. The logic of this regression technique, in nonmathematical terms, is to find a linear combination of dependent variables that maximally correlates with a linear combination of independent variables. Coefficients are estimated for both dependent and independent variables.

The equation used to obtain the correlations is:

$$a_1 \text{WAGE} + a_2 H_3 + a_3 H_4 + a_4 H_5 + a_5 H_6 + a_6 H_7 + a_7 H_8 = b_1 \text{WORKYR} + b_2 \text{WORKYR}^2 + b_3 \text{SCHOOL} + b_2 \text{CHINESE} + b_5 \text{MALAYS} + b_6 \text{EUROPE} \quad \ldots\ldots\ldots\ldots\ldots\ldots \quad (5)$$

where H_3 = Supervise

H_4 = Non-sedentary

H_5 = Repetitive

H_6 = Physical Demand

H_7 = Work Environment

H_8 = Firm Size

III ESTIMATION RESULTS

The weights obtained by equation (5) in tabulated in Table 25:-

TABLE 25

WEIGHTS ON EARNINGS COMPONENTS FROM CANONICAL CORRELATION

Earnings Components	Coefficient
1. Wage	0.7876
2. Supervise	0.0875
3. Non-sedentary	-0.1800
4. Repetitive	-0.0588
5. Physical Demand	-0.0984
6. Work Environment	0.0458
7. Firm Size	-0.0064

In the result obtained, wage receives a high weight relative to other job characteristics variables. It accounts 0.7876 of the earning components. Non-sedentary variable is the next most important, but the sign of the

coefficient is negative indicating a nonpecuniary disbenefit. Among other variables, the firm size coefficient had the lowest weight which is less than 1% of the earning components.

With this weight index, we create a new dependent variable by combining the pecuniary and nonpecuniary variables into a single, additive measures denoted as EARNING.

EARNING = WAGE x 0.78 + SUPERVISE x 0.08 - NONSEDENTARY x 0.18 - REPETITIVE x 0.05 - PHYSICAL DEMAND x 0.09 + WORKENV. x 0.04 - FIRM SIZE x 0.006

Regressions were again run with work experience (WORKYR), work experience squared ($WOKRYR^2$), SCHOOLING, CHINESE, MALAYS, EUROPEAN (three race dummy variables) as independent variables and LNWAGE, SUPERVISE, NON-SEDENTARY, REPETITIVE, PHYSICAL DEMAND, WORK ENVIRONMENT, FIRM SIZE were entered separately as dependent. The estimated results with error in parentheses beneath are presented in Table 26.

The coefficient of education variables had positive relationship with all but three nonpecuniary variables, namely 'NON-SEDNETARY', 'REPETITIVE', and 'PHYSICAL DEMAND'.

TABLE 26

REGRESSION COEFFICIENTS OF SCHOOLING AND WORK EXPERIENCE

	WORKYR	$WORKYR^2$	SCHOOLING	CHINESE	MALAY	EUROPE	R^2
LNWAGE	-0.0050 * (0.0059)	0.0002 * (0.0001)	0.0816 * (0.0087)	-0.7495 * (0.0861)	-1.0832 * (0.1246)	-0.0927 * (0.2097)	0.13
SUPERVISE	0.0165 * (0.0032)	-0.0002 * (0.0001)	0.0621 * (0.0034)	-0.1089 (0.1445)	-0.1230 (0.1466)	0.0520 (0.1926)	0.22
NON SEDENTARY	-0.0033 (0.0031)	-0.0000 (0.0001)	-0.0651 * (0.0034)	0.1143 (0.1424)	0.2072 (0.1444)	0.0326 (0.1899)	0.25
REPETITIVE	-0.0110 * (0.0038)	-0.0000 (0.0001)	-0.0239 * (0.0041)	0.0495 (0.1745)	0.1940 (0.1770)	0.1409 (0.2326)	0.07
PHYSICAL DEMAND	-0.0026 (0.0033)	-0.0000 (0.0001)	-0.0642 * (0.0035)	-0.0449 (0.1498)	-0.0717 (0.1520)	-0.1667 (0.1997)	0.22
WORK ENVIRONMENT	-0.0023 (0.0028)	-0.0000 (0.0001)	0.0006 (0.0030)	-0.0409 * (0.1274)	-0.0900 (0.1292)	-0.1408 (0.1699)	0.01
FIRM SIZE	0.0010 (0.0040)	-0.0000 (0.0001)	0.0062 * (0.0043)	0.0542 (0.1832)	0.0305 (0.1858)	0.2957 (0.2442)	0.01
LN EARNING	-0.0056 (0.0061)	-0.0002 (0.0001)	0.0928 * (0.0090)	-0.8723 * (0.0889)	-1.2629 * (0.1288)	-0.0560 (0.2166)	0.16

* significant at 5% level

The coefficient of education increased if non-pecuniary components are added as dependent variables. The estimated coefficients increased from 0.0861 to 0.0928. The coefficients of education are therefore underestimated if non-pecuniary components are excluded.

The coefficients on experience and experience squared have no consistent effect. In our results, there is slightly decrease when nonpecuniary variables are included. The coefficients decreases from -0.0050 to -0.0056. Race components did not have significant effect in most cases.

In short, though our model is relatively simple, it shows that when non-pecuniary benefits are included into the earnings function. The importance of the independent variables may be changed. The size of change as mentioned, will depend upon the ways in which these independent variables themselves relate to non-pecuniary earnings.

An additional noteworthy point from our results is the increase in the explanatory power of the simple human capital earnings equation. The R^2 has increased by 0.03 when nonpecuniary variables are added.

CONCLUSION

Most of the past empirical studies of earnings functions have failed to include non-pecuniary benefits in earnings measures. The empirical work done in this Chapter throw some light on the implication of the non pecuniary components in the studies of earnings functions. Duncan had shown the importance of some POSITIVE non-pecuniary benefit in earnings measures.[5] Our empirical work, on the other hand, demonstrated that the existence of non-pecuniary disbenefits where scaler k may equal to some negative value.

We found that the education variable was still the most significant determinant of all but one of the six non-pecuniary variables. When pecuniary and non-pecuniary variables are combined into a single additive measures, both the coefficient and R^2 are increased, It reflects that the importance of the education variable in the total earning equation is understated.

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[5] Greg J. Duncan, "Earnings Functions and Non-pecuniary Benefits", Journal of Human Resources No.4, 1976.

CHAPTER SIX

CONCLUSION

Adam Smith's compensation principle states that an individual would choose a job based on the combination of pecuniary and non-pecuniary benefits aspects of his expected earnings. Workers taking distasteful job would be accordingly rewarded by higher wage rate in compensation for their obnoxious task. Adam Smith observed that a public hangman received higher monetary wage than others. It is established that an individual's real income is therefore a combination of monetary benefits and non-monetary benefits (or disbenefits). Given a perfectly functioning market and other cruial assumptions, there would be no difference in real earnings. It would be an equalizing of net benefits and disbenefits in all occupations. Research on the problem of equalizing differences are numerous[1] in economic literature, but only a few of them had included the non-pecuniary aspects into account, studies using monetary earnings alone would unevitably biased both in theory and empirical studies.

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[1] For example, Reder concluded that evidence favors the competitive hypothesis. Friedman investigated the risk-taking behavior. Mincer has shown that the consequence of compensatory differentials due to cost of occupational training. See M. Reder, "Wage Structure Theory and Measurement" in Aspect of Labor Economics. (Princeton: Princeton University Press, 1962). M. Friedman, op.cit. J. Mincer, "Investment in Human Capital and Personal Income Distribution". Journal of Political Economy, August/1958.

In the present studies, several job characteristics variables have been entered into the wage equation and tried to measure its effects on earnings and in an attempt to test, to what extent,that the psychic wage existed. The methodology used is called hedonic wage equation. It is mainly developed by Kevin Lancaster and Robert Lucas in which both the personal characteristics and the job characteristics are included in the wage equation. The job characteristics are chosen as close as possible to reflect an occupation's entrance requirement, nature of the occupation, working condition, vocational training, and the establishment of the firm. This methodology is relatively new in economic research and by far the first attempt in applying to a developing country in Asia.

Our empirical results revealed that in Singapore, a development industrial city-state in South-East Asia, psychic wage is almost missed from the over-all sample regression indicating that occupations in which work is more unpleasant and distasteful command lower, not higher wage. There are a wide range of possible explanation to these apparent contradictions.[2] However, we find that the occupational

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[2] For example, Gary Becker's theory of specific training provided a possible explanation, see his Human Capital. (New York: Columbia University Press, 1964.)

skill factor is a possible explanation in Singapore. Since once the schooling level is controlled, psychic wage did existed. Ceteris paribus, we found that well-educated worker (with 13-year education and above) in fact received substantial higher wage in compensation for undertaking non-sedentary and repetitive jobs. If skill can be generated by additional education, skill would be more equally distributed among better educated workers. Psychic wage therefore existed among educated workers while less educated worker are not compensated because they lack of certain skill.

We further investigate the problem of occupational choice. Workers are assumed to trade-off the pecuniary and non-pecuniary benefits along his job opportunity set according to his taste preference in choosing an occupation. Tastes are determined in heaven, it is at least conditioned, to certain extent, by educational attainment and personal background. Obviously the taste of an individual with university education, ceteris paribus, would different from an individual with primary education. Generally speaking, the more educated group would place more value on non-pecuniary aspect of an occupation and the less educated group the converse. Furthermore, the higher real income of a society, the greater the weight that the society will

put on the non-pecuniary side of occupation choice. A President of an American University remarked that as real income continues to rise, it may see the day when a garbage collector is paid more than a full professor.[3] However, as Singapore is only a developing country, we find that the taste preference to non-pecuniary aspect of an occupation is not so strong as that in the United States. The result revealed that the higher level occupation weighted more emphrasis on non-pecuniary aspects. Among the ten taste preference variables, we found that salary, the chance of promotion, and job accomplishment are the more important taste preference variables. Workers are willing to trade-off monetary wage to certain non-pecuniary benefits, such as job security.

Finally, we have tested the effect of non-pecuniary benefits (or dis-benefits) on the explanatory variables. By utilizing the canonical correlation regression method, we obtain a weighted additive between pecuniary and non-pecuniary benefits. An individual's real income is therefore the combination of these two kinds of benefits. We showed that once when non-pecuniary variables are added, certain explanatory variables, especially the SCHOOLING variable, had increased its importance. The explanatory

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[3] W.G. Bowen 'Assessing the Economic Contribution of Education' quoted in M. Blaug, (ed.), Economics of Education, Volume One. (Middlesex: the Penguin Books, 1968.) P.83.

power of the equation has also greater since the R^2 is bigger. It demonstrates that empirical work that omits non-pecuniary benefits will lead wither over- or under-estimated the true importance of the explanatory variables.

APPENDIX A

ey Research Singapore (Pte.) Ltd.,
Jalan Jintan,
APORE, 9.

J.8139 (1)
Q'aire No. 1101 (2-5)
Firm/Factory No. _____ (6-8)

/July, 1974

J.8139 - STANFORD LABOUR SURVEY

Date : _____
Time Started : _____

RODUCTION

Good morning/afternoon/evening. My name is ..... I work as an interviewer for Economic Research Centre. This week we are conducting a survey of workers in factories in Singapore.

早安/午安/晚安，我的名字是 ..... 我是星加坡市场研究公司的採訪员，这是一间独立的研究公司，我们正在星加坡国内執行各类的調查，这个星期我们正在进行調查有关在星加坡製造厰商或者工厰里工作的人。

Selamat pagi/tengahari/petang. Nama saya ia-lah ..... Saya bekerja sabagai juruduga bagi Pusat Penyiasatan Ekonomi. Pada minggu ini kami sedang membuat penyelidekan mengenai pekerja2 di-kilang2 di-Singapura.

e of Firm/Factory : _____

n/Factory Address (Street/City/Zone): _____ _____ _____

CODE:	Urban	Satellite	Suburban	Rural
Yes	1 (9)	1 (10)	1 (11)	1 (12)
No	0	0	0	0

e of Respondent : _____

e Address (Street/City/Zone) : _____ _____ _____

CODE:	Urban	Satellite	Suburban	Rural
Yes	1 (13)	1 (14)	1 (15)	1 (16)
No	0	0	0	0

BACKGROUND DATA

Respondent is :

Proprietor/Partner/Shareholder	1	Clerical	8 (17)
Manager	2	Production Worker - full time	9
High Level Executive	3	- casual/temporary	0
Middle Level Executive	4	Miscellaneous - full time	x
Professional	5	- casual/temporary	y
Work Area Supervisor	6		
Tradesman	7		

Country of Birth

In which country were you born? 請问您是在那一个国家出生的？

Di-negeri manakah awak di-lahirkan?

Singapore	1 (18)
Malaysia (West Malaysia)	2
Malaysia (East/Sabah/Sarawak)	3
Brunei	4)
Indonesia	5)
China/Hong Kong/Taiwan	6)
Other country (in Asia)	7)
Other country (outside Asia)	8)

Code all

~~IF BORN IN SINGAPORE/MALAYSIA, ASK~~

(b) Whereabout were you actually born? PROBE: Was it in an urban, suburban/small town or rural area?
您实际上是出生在什么地方？PROBE：是否是在市区，郊外/小市镇或是乡村区域？
Di-manakah sa-benar-nya awak telah di-lahirkan?
PROBE: Adakah di-kawasan bandar, bandar kechil atau kawasan luar bandar?

Write in _____

Urban	2 (19)
Suburban/small town	1
Rural	0

ASK ALL CITIZENSHIP

3. Are you a citizen of Singapore/Malaysia?
您是否是星加坡公民/马来西亚公民？
Adakah awak warganegara Singapura/Malaysia?

	Singapore	Malaysia
Yes	1 (20)	1 (21)
No	0	0

What is your exact age last birthday?
請您告訴我您上一次生日時的確实年齡？
Berapakah umor awak sahenar-nya pada hari jadi awak yang lalu?

WRITE IN EXACT AGE : _____ YRS. _____ MTHS.

CODE YEARS OF LAST BIRTHDAY [ ][ ] (22) (23)

OFFICE CODE : [ ] (24)

Language

What language/dialects do you speak at home?
您在家里講什么語言/方言？
Apakah bahasa/loghat2 yang awak gunakan di-rumah?

	English	Malay	Tamil	Chinese
Yes	1 (25)	1 (26)	1 (27)	1 (28)
No	0	0	0	0 - GO TO Q.6

IF CHINESE, ASK :

(b) Which Chinese dialect do you mainly speak at home?
您在家里主要是講什么方言的？
Apakah loghat2 yang paling banyak awak gunakan semasa di-rumah?

Mandarin	1	Cantonese	4	(29)
Hokkien	2	Hainanese	5	
Teochew	3	Other (_____) WRITE IN	6	

OFFICE : DO NOT SPEAK CHINESE 0

Type of Dwelling :

What type of dwelling are you living in?
您是住在什么类型的住宅？
Apakah jenis tempat tinggal awak?

Attap/Zinc/Worker quarters	1	Shop houses/terrace/ row houses	4	(30)
HDB/JTC/PSA Public Authority Flats		Private Flats/ Apartments	5	
1 - 2 Rooms	2	Compound/Bungalow/ Semi-detached	6	
3+ Rooms	3			

PERSONAL

Have you served in full time National Service?
您是否服完了全職的国民服役？
Sudahkah awak menjalani Perkhidmatan Negara sa-penoh masa?

Yes 1 (31)

No 0

MARRIAGE

Have you ever married or have you never married?
您是否曾经結过婚或不曾結过婚？
Adakah awak telah pernah berumah tangga atau tidak pernah berumah tangga?

Ever married 1 (32)

Never married 0 GO TO Q.9

IF EVER MARRIED, ASK

(b) How many children do you have, that is of all ages, including any who are not living here now?
您一共有多少个孩子，那即是包括各种年齡，以及任何目前不在这里住的？
Berapa ramaikah anak awak, ia-itu dalam semua perengkat umor, termasoklah yang tidak tinggal di-sini sekarang?

WRITE IN _____ [ ][ ] (33) (34)

(c) How many are still dependent on you? EXPLAIN : By dependent I mean that they draw half or more of their financial support from you.
多少个孩子仍然是依靠您的？我的意思是您是否要負担他们一半的经济或更多的经济开銷？
Berapa ramaikah yang maseh dalam tanggongan awak? JELASKAN bahawa tanggongan berma'na mereka2 yang mendapatkan separoh atau lebeh bantuan kewangan dari awak.

WRITE IN _____ [ ][ ] (35) (36)

ASK ALL

9. Apart from children and your wife how many dependents like parents, grandparents or relatives do you have? EXPLAIN : By dependent I mean that they draw half or more of their financial support from you.
除了您的孩子们与您的妻子之外，有多少个依靠您的人，如父母，祖父母或亲戚？EXPLAIN：依靠的意思是他们是否从您那里拿一半或更多的经济开銷？
Salain dari anak2 dan isteri awak berapa ramaikah tanggongan awak seperti ibu bapa, datuk nenek atau saudara mara? JELASKAN bahawa tanggongan berma'na mereka2 yang mendapatkan separoh atau lebeh bantuan kewangan dari awak.

WRITE IN _____ [ ] (37)

Now I would like you to think back to the time you were about 13 years of age. How many brothers and sisters did you have when you were 13 years old?
現在我想要您回想大約在您十三岁的時候，您有多少个兄弟姐妹？

Sekarang saya ingin supaya awak mengingat kembali pada ketika awak berumor kira2 13 tahun. Berapa ramaikah abang, adek dan kakak awak ketika awak berumor 13 tahun?

(38)	(39)

Ranking from the eldest to the youngest, what number were you in the family?
依照秩序从年長者至年幼者，您在您的家庭中是排行第几？

Mengikut perengkat dari yang tua hingga yang muda awak anak ke-berapa?

(40)	(41)

Do you remember what sort of dwelling you lived in when you were about 13 years old?
您是否記得当您在大約十三岁的時候，您是住在什么樣式的住屋？

Ingatkah awak jenis tempat tinggal awak ketika awak berumor kira2 13 tahun?

Can't remember	0	(42)
Attap/Zinc/Worker Quarters	1	
HDB/JTC/PSA/Public Authority Flats 1 - 2 Rooms	2	
3+ Rooms	3	
Shophouses/Terrace/Row Houses	4	
Private Flats/Apartments	5	
Bungalow/Semi-detached/Detached/ Compound	6	

At that time did your household occupy the whole dwelling or share with other households?
在那个時候，您的府上是否佔有整个住屋或是与其他的家庭共用？

Pada ketika itu adakah keluarga awak tinggal bersendirian atau berkongsi dengan lain2 keluarga?

Whole	1	(43)
Shared	0	

Did your family own that dwelling?
您的家庭是否拥有那间住屋？

Adakah rumah itu kepunyaan keluarga awak?

Yes	1	(44)
No	0	
Don't know	2	

When you were 13 years old, did your family own a house or apartment apart from the one you were living in?
当您在十三岁的時候，除了您住的那间住屋外，您的家庭是否拥有一间屋子或是一间公寓？

Ketika awak berumor 13 tahun adakah keluarga awak mempunyai rumah atau bilek sendiri sa-lain dari rumah yang awak tinggal itu?

Yes	1	(45)
No	0	
Don't know	2	

When you were about 13 years of age, did your household or someone in your house own ..... (READ OUT).
当您大約在十三岁的時候，您的府上或者是您府上的任何一个人拥有..... (讀出)

Ketika awak berumor kira2 13 tahun adakah keluarga awak atau sesiapa dalam keluarga awak mempunyai ..... (READ OUT).

	Telephone	Radio	Motor Car	
Yes	1 (46)	1 (47)	1	(48)
No	0	0	0	
Don't know	2	2	2	

(f) Did any one in your household own a store, factory or any commercial property?
您府上是否有任何从拥有一间商店，工厂或是任何的商业资产？
Adakah sesiapa dalam keluarga awak yang mempunyai tempat simpan barang2, kilang atau sebarang harta benda perdagangan?

		(49)
Yes	1	
No	0	
Don't know	2	

(g) Did your household have a servant or domestic help when you were about 13 years old?
当您大約在十三岁的時候，在您的府上是否有僱用一个佣从或是一个家庭帮手？
Adakah keluarga awak mempunyai orang gaji atau penolong rumah tangga ketika awak berumor kira2 13 tahun?

		(50)
Yes	1	
No	0	
Don't know	2	

PARENTS & THEIR EDUCATION

Race : What is the ethnic group of (a) your father and (b) your mother?
(a) 您的父亲和(b)您的母亲是属於什么种族的？
Apakah bangsa (a) bapa dan (b) ibu awak?

	Both Father & Mother	Only Father	Only Mother	None	
Chinese	2	1	1	0	(51)
Malay	2	1	1	0	(52)
Indian	2	1	1	0	(53)
European/Eurasian	2	1	1	0	(54)

(a) How much education did your father (or male guardian) receive? Did he ever attend ..... (READ OUT)?
您的父亲(或男性監護从)受过怎样的教育程度？他是否曾经参加过.....(講出)？
Setakat manakah pelajaran yang bapa (atau penjaga laki2) awak perolehi? Pernahkah dia menuntut ..... (READ OUT).

(b) How much education did your mother (or female guardian) receive? Did she ever attend ..... (READ OUT)?
您的母亲(或女性監護从)受过怎样的教育程度？他是否曾经参加过.....(講出)？
Setakat manakah pelajaran yang ibu awak (atau penjaga perempuan) awak perolehi? Pernahkah dia menuntut ..... (READ OUT).

	Father/Male Guardian			Mother/Female Guardian		
	Yes	No		Yes	No	
No formal education	1	0	(55)	1	0	(62)
Some primary	1	0	(56)	1	0	(63)
Completed primary	1	0	(57)	1	0	(64)
Some Secondary	1	0	(58)	1	0	(65)
Completed Secondary and/ or Pre-U	1	0	(59)	1	0	(66)
Completed University/ College	1	0	(60)	1	0	(67)
IF DON'T KNOW CODE ALL '0'						
SUMMARY CODE : KNOW	1		(61)	1		(68)
DON'T KNOW	0			0		

FATHER/MALE GUARDIAN

Can you please tell me all the occupations your father (or male guardian in your household) held for more than a year starting from the time you were 13 years old and going back until you were born. PROBE : What occupation did he have when you were 13 years old? How long had he been in that occupation? What occupation did he have before that? PROBE : What kind of things did he do at this job? NOT where did he work?
可否請您告訴我您的父亲(或您府上的男性監護从)所做过多过於一年的所有戟业,从您十三岁开始向回到您出生為止. PROBE:当您十三岁時,他做过什么戟业?那份戟业做了多久?在这份工作之前,以前有过什么戟业? PROBE: 在这份工作他是做些什么类的工作?不是指他在那里工作?
Bolehkah awak beritahu saya semua pekerjaran2 yang di-jawat lebeh dari satu tahun oleh bapa awak (atau penjaga laki2) awak bermula dari masa awak berumor 13 tahun dan sejak awak di-lahirkan hingga berumor 13 tahun. PROBE : Apakah pekerjaan-nya ketika awak berumor 13 tahun? Berapa lamakah ia memegang jawatan itu? Apakah pekerjaan-nya sebelum itu? PROBE : Apakah perkara2 yang di-lakukan-nya dalam pekerjaan-nya itu? BUKAN di-mana dia bekerja?

INTERVIEWER LIST OCCUPATIONS HELD FOR MORE THAN A YEAR. START WHEN RESPONDENT AGED 13 YEARS AND GO BACK TO WHEN RESPONDENT BORN.

OCCUPATION	YEAR	
	FROM	TO

INTERVIEWER CODE (REPEAT CODE IF ONLY ONE OCCUPATION)

(a) OCCUPATION HELD LONGEST [ ] [ ] [ ] (69) (70) (71)

(b) OCCUPATION HELD SECOND LONGEST [ ] [ ] [ ] (72) (73) (74)

FOR MOTHER/FEMALE GUARDIAN ONLY, ASK

Did your mother (or female guardian) ever work from the time you were born until you you were 13 years?
您的母亲(或女性監護从)從您出生至十三岁時是否曾经做过工?
Adakah ibu (atau penjaga perempuan) awak pernah bekerja dari ketika awak di-lahirkan hingga awak berumor 13 tahun?

Yes 1 (75)
No 0 GO TO Q.17

IF YES, ASK

(b) What was (the last) job she had?
她(最后的)那份工作是什么? Write in _____ [ ] [ ] [ ] (76) (77) (78)
Apakah pekerjaan-nya yang terakhir?

SKIP → *79 END C1 *801

PUNCH CARD 2 : REPEAT *1 - *7

OWN EDUCATION

How much education did you yourself receive? Did you ever attend ..... (READ OUT)?
您自己受过怎样的教育程度？
您是否曾经参加 ..... (讲面)?
Setakat manakah pelajaran yang telah awak perolehi? Pernahkah awak menuntut ..... (READ OUT).

	Yes	No	
Primary School	1	0	(6
Secondary School	1	0	(7
Pre-University	1	0	(8
College	1	0	(9
Vocational Institute	1	0	(10
University	1	0	(11

ASK APPROPRIATE QUESTIONS FOR EACH LEVEL ATTENDED

PRIMARY

(a) How many years of primary education have you completed?
您完成了多少年的小學教育？
Berapa tahunkah pelajaran rendah yang telah awak chapai?

No. of yrs.	1	2	3	4	5	6	(12
No Primary	0						

(b) Did you pass the primary school leaving examination (PSLE)? OR ITS EQUIVALENT IF EDUCATED OVERSEAS.
您的小學离校考試是否及格？
Adakah awak telah lulus pepereksaan Sijil Tamat Sekolah Rendah? ATAU YANG SA-TARAF DENGAN-NYA JIKA MENUNTUT DI-SEBERANG LAUT.

Yes	1	(13
No	0	

(c) Did you have most of your primary schooling in English, Chinese, Malay or Tamil?
您在小學接受最多的教育是英文，华文，馬来文或是淡米尔文？
Adakah kebanyakan persekolahan rendah awak di-dapati dari sekolah Inggeris, China, Melayu atau Tamil?

	Yes	No	
English	1	0	(14)
Chinese	1	0	(15)
Malay/Tamil	1	0	(16)

SECONDARY

(a) How many years of secondary education (not counting pre-Uni.) have you completed?
您完成了多少年的中學教育(不包括高级中學)？
Berapa tahunkah pelajaran menengah (tidak termasok Pr-Universiti) yang telah awak chapai?

No. of yrs.	1	2	3	4	5	6	(17)
No Secondary	0						

(b) Did you obtain the MCE/SC/GCE "O" level? OR ITS EQUIVALENT IF EDUCATED OVERSEAS.
您是否獲得 MCE/SC/GCE "O" 的水準？或者是海外相等的水準. Adakah awak telah lulus MCE/SC/GCE perengkat "O" ATAU YANG SA-TARAF DENGAN-NYA JIKA MENUNTUT DI-SEBERANG LAUT.

Yes	1	(18)
No	0	

(c) Did you have most of your secondary school in English, Chinese, Malay or Tamil?
您在中學接受最多的教育是英文，华文，馬来文或淡米尔文？ Adakah kebanyakan persekolahan menengah awak di-dapati dari sekolah Inggeris, China, Melayu atau Tamil?

	Yes	No	
English	1	0	(19)
Chinese	1	0	(20)
Malay/Tamil	1	0	(21)

(d) What type of curriculum did you take in secondary school? Was it ..... (READ OUT)?
在中學時您是該什么課程的？即是 ..... (讲面)?
Apakah jenis mata pelajaran yang awak pelajari ketika awak di-[illegible]? Adakah ..... (READ OUT)?

Arts	1	(22
Science	2	
Technical	3	
Commercial	4	

PRE-UNIVERSITY

How many years of Pre-University have you completed in total?
您總共完成了多少年的高級中學教育？ Berapa tahunkah pengajian pra-Universiti yang telah awak chapai?

No. of yrs. 1 2 (23)

No Pre-U 0

Did you obtain the HSC/GCE "A" level? OR ITS EQUIVALENT OVERSEAS.
您是否獲得 HSC/GCE "A" 的水準？或者是海外相等的水準。 Adakah awak telah lulus HSC/GCE perengkat 'A' ATAU YANG SA-TARAF DENGAN-NYA JIKA MENUNTUT DI-SEBERANG LAUT.

Yes 1 (24)

No 0

Did you have most of your Pre-University schooling in English, Chinese, Malay or Tamil?
您在高級中學接受最多的教育是英文，华文，馬来文或是淡米尔文？
Adakah kebanyakan persekolahan Pra-Universiti awak di-dapati dari sekolah Inggeris, China, Melayu atau Tamil?

	Yes	No	
English	1	0	(25)
Chinese	1	0	(26)
Malay/Tamil	1	0	(27)

What type of curriculum did you take in Pre-University classes? Was it ..... (READ OUT)?
您在高級中學時，是攻讀什么課程的？那是 ..... (讀出)？
Apakah jenis mata pelajaran yang awak pelajari di-kelas2 pra-Universiti? Adakah ..... (READ OUT)?

Arts	1	(28)
Science	2	
Technical	3	
Commercial	4	

COLLEGE

How many years of college education have you completed?
您完成了多少年的專科學院的教育？ Berapa tahunkah pengajian maktab yang telah awak chapai?

No. of yrs. 1 2 3 4 5 (29)

No College 0

Which college did you attend? READ OUT
您是攻讀那一间學院的？(請出)
Di-maktab manakah yang awak masokki? READ OUT.

Ngee Ann Technical College	1	(30)
Singapore Polytechnic	2	
Singapore Technical Institute	3	
Singapore Teacher Training (Inst. of Education)	4	
Other OVERSEAS _____	5	

UNIVERSITY

How many years of university education have you completed?
您完成了多少年的大學教育？
Berapa tahun kah pengajian Universiti yang telah awak chapai?

No. of yrs. 1 2 3 4 5 (31)

No University 0

Which University did you attend? READ OUT
您是攻讀那一间大學的？(讀出)
Di-Universiti manakah yang awak masokki? READ OUT.

University of Singapore	1	(32)
Nanyang University	2	
University of Malaya	3	
Other (_____ WRITE IN)	4	

	Yes	No	
Did you receive your bachelor degree? 您是否獲得學士學位？ Adakah awak telah menerima ijazah sarjana muda?	1	0	(33)
(d) Did you have honours? 您是否拥有榮譽學位？ Adakah awak telah mendapat kepujian?	1	0	(34)
(e) Do you have a Masters or Ph.D degree? 您是否拥有碩士或博士學位？ Adakah awak mempunyai ijazah Sarjana atau ijazah Falsafah?	1	0	(35)

(f) What was the major subject you studied for your bachelor degree in the University/College?
您在大學/專科學院所主修的科目是什么？
Apakah mata pelajaran utama awak ketika dalam pengajian Sarjana muda di-Universiti/Maktab?

Arts and humanities	1	(36)
Social Sciences	2	
Natural Sciences	3	
Engineering	4	
Medical Sciences	5	
Agriculture	6	

VOCATIONAL INSTITUTE EDUCATION/TRAINING

a) How many months of Vocational Institute education did you have before you started work?
您在向谢工作之前，您曾经有受过多少个月的职业教育课程？
Sa-lama berapa bulankah pengajian kejuruan yang telah awak pelajari sa-belum awak mula bekerja?

WRITE IN NO. OF MONTHS _____ (37) (38)

b) Which Vocational Institute did you attend?
您是攻读那一间职业学院？
Di-Institut kejuruan manakah awak telah menuntut?

Aljunied	1	(39)
Baharuddin	2	
Boy's Town	3	
Bukit Merah	4	
Central Supplies & Maintenance Unit	5	
Geylang Serai	6	
Hotel & Catering Training	7	
Jurong	8	
Pasir Panjang	9	
Ponggol	x	
Singapore	y	
None of above	0	

IF ONE OF ABOVE NOT CODED RESPONDENT HAS NOT ATTENDED A VOCATIONAL INSTITUTE

ASK ALL

a) Have you received a National Trade Test Certificate?
您是否拥有一种国家商业考试证书？ Adakah awak telah menerima sijil Ujian Perdagangan Kebangsaan (National Trade Test)?

Yes	1	(40)
No	0	GO TO Q.25

IF YES, ASK

(b) Which one did you receive? Was it ..... (READ OUT)?
您是拥有那一种？那是 ..... (读出)？ Yang mana satukah yang telah awak perolehi? Adakah ..... (READ OUT)?

Trade I	1	(41)
Trade II	2	
Trade III	3	

OTHER COURSES

a) Did you study for any professional examinations outside of the normal Government sponsored school system? Such as the Institute of Accountants.
在政府资助而办的学校制度外，您是否有攻读任何专业考试，例如在会计学院，新加坡工商管理学院，大学校外课程等地方。 Adakah awak telah mempelajari bagi sebarang pepereksaan professional, salain dari sistem persekolahan biasa yang di-anjorkan oleh Kerajaan? Saperti Institut Jurukira (The Institute of Accountants)

Yes	1	(42)
No	0	GO TO Q.26

IF YES, ASK

(b) Did you receive a Certificate or Diploma to say that you had completed the course?
您是否有受到一张证书或文凭证明您已完成 [illegible] Adakah awak telah menerima [illegible]

Yes	1	(43)
No	0	

(c) [illegible]

JOB(S) & LOOKING FOR JOB(S)

How long did it take for you to find your first full time job after you finished schooling? IF NOT GONE TO SCHOOL, ASK : How long did it take for you to find your first full time job when you first came out to work?
您完成學业之後，多久才找到你的第一份全戟工作？如果沒有進过學校，向：当您第一次出来做工時，多久才找到您的第一份全戟工作？

Berapa lamakah baru awak mendapat pekerjaan sa-penoh masa awak yang pertama, satelah awak tamat persekolahan? IF NOT GONE TO SCHOOL, ASK Berapa lamakah baru awak mendapat pekerjaan sa-penoh masa yang pertama bila awak mula2 bekerja?

WRITE IN ~~NO. OF MONTHS~~: _____

OFFICE [ ][ ] (44) (45)

What was the first job you had when you first went to work?
当您第一次出去做工時，您的第一份工作是什么？
Apakah pekerjaan awak yang pertama bila awak mula bekerja bagi pertama kali?

WRITE IN : _____

[ ][ ][ ] (46) (47) (48)

What was the last job before you got this present job?
在您做目前这份工作之前的最後一份工作是什么？
Apakah pekerjaan awak yang lalu sabelum awak memegang jawatan sekarang?

WRITE IN : _____

[ ][ ][ ] (49) (50) (51)

What was your main reasons for leaving that last job? (PROBE : Did you leave because you yourself wished to leave or because of some other reasons? What?)
您辞掉那最後一份工作的主要原因是什么？(PROBE：您辞工是因為您自己不要做或是因為其他的原因？是什么原因？)
Apakah sebab2 utama maka awak meninggalkan pekerjaan yang lalu? (PROBE : Adakah awak meninggalkan jawatan itu kerana kehendak awak sendiri atau kerana sebab2 yang lain? Apa?

WRITE IN : _____ & CODE

Age	1	(52)
Health	2	
Family Commitments	3	
Parental/Husband Objection	4	
Poor salary	5	
Shift System	6	
Other unhappy working conditions	7	
Retrenchment	8	
National Service	9	
Non-Citizen	x	
Other	y	

How many years have you been working?
您已经工作了多少年？
Sudah berapa lamakah awak bekerja?

WRITE IN NO. OF YEARS: _____

[ ][ ] (53) (54)

How many times have you changed jobs since you started working?
自從您开始工作以来，您換了多少次工作？
Telah berapa kalikah awak bertukar pekerjaan sejak awak mula bekerja?

WRITE IN NO. OF TIMES: _____

[ ] (55)

) Are you a member of any trade union? Yes 1 (56)
您是否是任何商业工会的会员? No 0 GO TO Q.32
Adakah awak menjadi ahli sebarang kesatuan sakerja?

IF YES, ASK

(b) What is the name of the trade union? WRITE IN : _____
那商业工会的名称是什么?
Apakah nama kesatuan sakerja itu? (57)

COMPANY EXPERIENCE

a) What is the exact type of work you yourself now do with this company? PROBE : What kinds of things do you do at your work? WRITE IN : _____
您現在在这间公司的正確職務是什么?
PROBE : 您是做些那一类的工作?
Apakah sabenar-nya jenis pekerjaan yang awak lakukan di-sharikat ini sekarang? PROBE : Apakah perkara2 yang awak lalukan dalam pekerjaan awak? (58) (59) (60)

b) Have you held any other positions in this company besides the present one? Yes 1 (61)
您在这间公司做目前这份工作之前,是否还有做过任何其他的職位? No 0 GO TO Q.33
Adakah awak memegang sebarang jawatan dalam sharikat ini salain dari jawatan yang awak pegang sekarang?

IF YES

(c) What was the last previous position you had before your present one? PROBE : What kinds of things did you do then? WRITE IN : _____
您在目前这份工作之前的最後一份職位是什么? PROBE: 您是做些那一类的工作?
Apakah jawatan awak yang lalu, sabelum awak memegang jawatan sekarang? PROBE : Apakah perkara2 yang awak lukukan pada ketika itu? (62) (63) (64

(d) What was the first position you ever had with this company? PROBE : What kinds of things did you do then? WRITE IN : _____
您初進这间公司當第一份職位是做什么的? PROBE: 您是做些那一类的工作? Apakah jawatan pertama awak di-sharikat ini?
PROBE : Apakah perkara2 yang awak lukukan dalam pekerjaan awak? (65) (66) (67)

33. How long have you been working in this company regardless of what jobs you have been doing? WRITE IN : _____ MONTHS
(MULTIPLY YEARS BY 12)
您在这间公司工作了多久,不管您曾做的是什么工作?
Berapa lamakah awak bekerja dengan sharikat ini, tanpa mengira jenis2 pekerjaan yang telah awak lakukan? (68) (69) (70)

34. How many ~~years~~ (months) ago did you first start doing the kind of work you are currently doing regardless of which company you worked for? WRITE IN : _____ MONTHS
在多少年(月)以前,您开始做您現在所做的这种工作,不管您是在那一间公司工作? Sudah berapa tahun (bulan) yang lalu mula2 sekali awak menjalani jenis pekerjaan yang awak lakukan sekarang ini tanpa mengira nama sharikat yang awak bekerja? (71) (72) (73)

TRAINING

During the period in which you have been employed with this company what training have you had either inside the company or outside?
您在这间公司里就任的一段期间内,在这公司里或外面是否有过什么训练课程?

Semasa awak bekerja dengan sharikat ini apakah latehan yang telah awak dapati samaada dari dalam atau luar sharikat?

Have you ever been given in-plant training inside the company? This might have been when you first joined the company or later when you were taken away from your job for special training.
您在这间公司里面是否曾经给过您特别的训练课程?这可能是当您最初加入公司时或数遍他们从您的工作岗位掉您去受特别的训练?
Pernahkah awak di-beri latehan dari dalam sharikat? Ini mungkin telah di-beri ketika awak mula2 masok bekerja atau kemudian-nya bila awak di-beri latehan yang tertentu.

	Yes	No	
In-plant training	Y	N	GO TO Q.35(c)

IF YES

(b) How many days in-plant training would you have had within this company?
在这间公司里,您有过多少天的特别训练课程?
Berapa harikah latehan tersebut yang telah awak ikuti dari dalam sharikat ini?

WRITE IN : _____

(74)	(75)	(76)

Whilst you have been working on-the-job have you been given training?
当您正在工作时,您是否曾经接受工作训练?
Ketika awak menjalankan pekerjaan semasa itu adakah awak menerima latehan?

	Yes	No	
On-the-job training	Y	N	GO TO Q.36(a)

IF YES

(d) How many weeks on-the-job training have you had with this company?
您在这间公司接受了多少个星期的工作训练?
Berapa minggukah latehan pekerjaan semasa itu telah awak dapati dari sharikat ini?

WRITE IN : _____

(77)	(78)	(79)

During the period in which you were employed, has your present employer ever sent you outside the factory/firm for special training, say to places like the Industrial Training Board, Vocational Institutes, National Productivity Board or some College or School?
在您就任的期间内,您目前的雇主是否曾经有派您去过在工厂/公司以外的特别训练,说到地方好像工业训练局,职业专科学院,国家生产局或一些学院或学校?
Semasa awak bekerja, adakah pernah pehak majikan awak sekarang menghantar awak keluar daripada kilang/sharikat untok mengikuti latehan yang tertentu saperti di-Lembaga Latehan Perusahan (Industrial Training Board), Institut2 Kejuruan (Vocational Institutes), Lembaga Daya Pengeluaran Negara (National Productivity Board) atau Maktab atau Sekolah?

Yes	1		(79)
No	0	GO TO Q.37	

Transfered to C3 *79!
0

END CARD 2 *802

PUNCH CARD 3 REPEAT #1 - #5

IF YES, ASK

36(b) Was it full-time or part-time?
那是全職或半職的？
Adakah ia-nya sepenoh masa atau saparoh masa?

Full-time	1	GO TO Q.36(d)	(6)
Part-time	0		
Both	2		

IF PART-TIME, ASK

(c) Did you attend the course after working hours or was it during working hours?
您所攻讀的課程是在工作的時間內或是工作以後的時間？
Adakah awak mengikuti kursus ini salepas waktu bekerja atau dalam masa bekerja?

After working hours	1	(7)
During working hours	0	
Both.	2	

(d) How long has this outside training taken?
这外面的訓練課程為期多久？
Berapa lamakah latehan luar ini mengambil masa?

WRITE IN : _____ MONTHS

OFFICE [ ][ ] (8) (9)

(e) WRITE IN NAME OF PLACE HERE FOR CHECKING PURPOSES ONLY

_____

(f) Did you obtain any Certificates for completing the course?
您是否獲得任何完成課程的証书？
Adakah awak telah mendapat sebarang Sijil sa-telah tamat mengikuti kursus tersebut?

Yes	1		(10)
No	0	GO TO Q.38	

IF YES, ASK

(g) What Certificates did you obtain?
您獲得什么証書？
Apakah Sijil2 yang telah awak perolehi?

_____

_____

_____

_____

[ ] (11)

37(a) During the period in which you were employed has your present employer ever sent you overseas for training?
在您就任的一段期間內，您目前的顧主是否曾經派您去海外受訓？
Semasa awak bekerja adakah pehak majikan awak sekarang pernah menghantar awak ka-luar negeri untok mengikuti latehan?

Yes	Y	
No	N	GO TO Q.38

IF YES, ASK

(b) For how long?
受訓多久？
Untok berapa lama-kah?

WRITE IN : _____ WEEKS

[ ][ ] (12) (13)

(c) Where did you go for training?
您去那裏受訓？
Kemanakah awak telah pergi untok mengikuti latehan itu?

WRITE IN : _____

[ ] (14)

ntil 1st July, how much did you
a month from your present job?
LUDE GROSS SALARY, OVERTIME AND COST
IVING ADJUSTMENT BEFORE TAXATION)
到七月一日為止，您從您目前的这份
作共賺了多少錢？(那是否已包括还沒
扣祖稅之前的總薪金，超時費和津貼)?
ingga 1hb Julai, berapakah pendapatan awak dalam sa-bulan
-i pekerjaan awak sekarang? (TERMASOK GAJI POKOK, KERJA
BEH MASA (OVERTIME) DAN LAUN PENYESUIAN SARA HIDUP SABELUM CHIKAI)

WRITE IN : _____

(15)	(16)	(17)	(18)

URCE OF INFORMATION (19)

Personal	1
Company	2
Showcard	3

d you receive, or will you receive, the NWC
ecommendation of wage increase (either 6% or
0%) from 1st July, 1974?
是一九七四年七月一日起，您是否接受到或
者將接受到NWC所提議的加薪制？(6%
或 10%)? Adakah awak menerima atau akan
enerima kenaikan gaji terbit dari shor Majlis
aji Kebangsaan (samaada 6% atau 10%) dari
hb. Julia, 1974?

(20)

Yes	1
No	0
DK	2

Did you receive the $25/- COLA?
您是否接受到二十五元的津貼？
Adakah awak telah menerima $25/- elaun
penyesuaian sara hidup (COLA)?

Did you receive, or will you
receive, the $40/- COLA?
您是否接受到或者將接受
到四十元的津貼？
Adakah awak telah menerima atau akan
menerima $40/- elaun penyesuaian
sara hidup (COLA)?

	$25	$40
Yes	1 (21)	1 (22)
No	0	0
DK	2	2

What fringe benefits do you receive
from this job that are not included
in the above earnings figure? WRITE
IN ESTIMATED AMOUNTS. EXPLAIN AMOUNT
IF NOT SURE.
您從这份工作是否接受过什么其他
的利益和津貼，那並不包括以上您
所賺的数目？
Apakah faedah2 dari jawatan ini yang
awak terima yang tidak termasok
dalam pendapatan awak yang di-atas?

	PER MONTH
Transportation allowance	$
Medical benefits	$
Meal allowance	$
CPF (COMPANY ONLY)	$
Bonus	$
Subsidised housing	$
TOTAL :	$

(23)	(24)	(25)	(26)

40(a) How many paid overtime hours did you work at this job last week since last ..... (NAME OF TODAY)?
上个星期从 ..... 您做了多少个辟头有加班费的超时工作？
Berapakah jumlah kerja lebeh masa (Overtime) awak yang di-bayar bagi pekerjaan ini minggu lepas sejak .....(NAME OF TODAY)?

WRITE IN : _____ HOU

(27) (28)

(b) What was the total number of paid hours you worked at this job last week since last ..... (NAME OF TODAY) including overtime if any?
上个星期从 ..... (NAME OF TODAY) 您受薪的工作小时是多少？这包括任何超时工作？
Berapakah jumlah masa bekerja yang di-bayar ketika awak melakukan pekerjaan ini minggu lepas sejak .....(NAME OF TODAY) termasok kerja lebeh masa (overtime) jika ada?

Write in _____

(29) (30)

IF LESS THAN 44 HOURS WORKED IN TOTAL, ASK

(c) Was there any particular reason why you worked less than 44 hours on this present job last week? What is the main reason?
上个星期您是否有特别的原因使您在目前这份工作少过44个小时，主要的原因是什么？
Adakah sebarang sebab mengapa awak bekerja kurang dari 44 jam bagi pekerjaan ini minggu lalu? Apakah sebab utama?

OFFICE CODE MAIN REASON : | | (31)

ASK ALL

(d) Was this last week a typical week?
EXPLAIN : Since ..... (NAME OF TODAY)?
上一週的工作時间是否是一个标準週？
EXPLAIN : 自從 ..... (NAME OF TODAY) ?
Adakah minggu lalu sama saperti minggu biasa? TERANGKAN : Sejak .....(NAME OF TODAY)?

Yes Y - GO TO Q.41
No N

IF NO

(e) In general, how many hours do you work on average in a typical week, including paid overtime?
普通来說，在一个标準週里，包括有加班費的超時工作，您平均做多少个辟头的工作？ Pada umum-nya berapa jamkah hitong panjang dalam sa-minggu awak bekerja termasok kerja lebeh masa (overtime) yang di-bayar?

WRITE IN : _____ HOU

(32) (33)

OFFICE : IF TYPICAL WEEK CODE FROM 40(b)

41(a) Are you interested in or have you thought about looking for more work?
您是否有兴趣或者有想过要尋找更多的工作？ Adakah awak berminat atau berfikir untok menchari kerja lebeh?

Yes Y
No N GO TO Q.42

IF YES, ASK

(b) How many extra hours a week would you be interested in working?
每个星期您有兴趣多做多少个小時的工作？
Berapa jamkah dalam sa-minggu yang awak

WRITE IN : _____ HOUR

In the past year, were there any weeks when you were not working or between jobs excluding vacation?
在去年中，除去假期外，您是否有任何星期是沒有做工或在轉工作當中？Pada tahun lalu, adakah sebarang minggu di-mana awak telah tidak bekerja atau awak bekerja untok beberapa waktu sahaja tidak termasok masa chuti?

WRITE IN : _____ WEEKS

(36) (37)

INTERVIEWER NOTE : IF 'NONE' GO TO Q.43

IF YES, ASK

(b) Of the weeks you were not working how many of the weeks were you actively looking for work? By this we mean that you were answering newspaper advertisements, showing up at the door of companies or otherwise actively looking for work?
在您沒有工作的几週內，您有多少个星期主动的在找工作？我们的意思是說您是應徵報紙上的廣告，去一些公司找工作或其他的方法主动的去找工作？Pada minggu yang awak telah tidak bekerja itu berapa minggukah awak benar2 berusaha untok menchari kerja? Ini berma'na ketika awak sebok menchari kerja melalui iklan di-surat2 khabar, pergi ka-pejabat2 untok menchari kerja dan lain2 untok untok mendapatkan pekerjaan?

WRITE IN : _____ WEEKS

OFFICE (38) (39)

(c) What were you doing the remaining weeks you were not working? (excluding vacation)
您沒有工作的其餘几週，您在做些什么？(不包括假期在內) Apakah yang telah awak buat pada minggu2 yang awak tidak bekerja? (tidak termasok chuti)

WRITE IN : _____ WEEKS

(40)

In the past month, how many days were you absent from work for any reason other then vacation?
除去假期外，在上个月內，您有多少天因為某些原因缺席沒有去工作？Pada bulan lalu, berapa harikah awak tidak bekerja kerana sebarang sebab sa-lain dari berchuti?

WRITE IN : _____ DAYS

(41) (42)

Do you have any other work which you do either from time to time or on a regular basis, which gives you extra income? (IF THE FIRST ANSWER IS 'NO', SAY : What you tell me is completely confidential and for statistical purposes only, added together with answers from other people; so your name is never known).
您是否还有其他的工作是您有時做或時常做来增加您的收入的？(IF THE FIRST ANSWER IS 'NO', SAY：关於您对我說的我们是絕对保守秘密的，我们只把您的答案加上其他的人的答案作个統計分析而已，因此您的名字並不会被公佈的) Adakah awak mempunyai sebarang pekerjaan lain yang awak lakukan dari masa ka-sa-masa, atau yang di-lakukan selalu, yang mendapatkan pendapatan yang lebeh. (IF THE FIRST ANSWER IS 'NO', SAY : Apa yang awak akan katakan ini ada-lah di-rahsiakan dan kerana sebab2 perangkaan sahaja, di-tambah dengan jawapan dari orang ramai, jadi nama awak tidak akan di-ketahui).

Yes 1 (43)

No 0 GO TO Q.45

IF YES, ASK

(b) How much do you earn from this job on average in a month?
您这份工作平均每个月賺多少錢？
Berapakah pendapatan dari pekerjaan ini yang awat terima hitong panjang dalam sa-bulan?

WRITE IN : $_____

(44) (45) (46)

(c) What was your occupation in this other job? What kind of work do you do?
在这其他的工作您的職业是什么？您做些那一类的工作？Apakah jawatan awak dalam pekerjaan yang lain itu? Apakah jenis pekerjaan yang awak lakukan?

WRITE IN : _____

(47) (48) (49)

(d) In general, how many hours do you work in this second job in a typical week?
普通来說，在这額外兩週內您这第二份工作做多少个鐘头？
Pada umum-nya, berapa lamkah awak melakukan pekerjaan yang kedua ini dalam sa-minggu?

FOR MARRIED MEN ONLY, ASK

(a) Is your wife working nowadays?
您的妻子目前是否有工作？
Adakah isteri awak bekerja sekarang?

Yes Y
No N GO TO Q.45 a)

IF YES, ASK

(b) How many hours does she work on average in a typical week?
FORCE ANSWER
她平均在一个标準週内工作多少个小時？
Berapa jamkan hitong panjang dia bekerja dalam sa-minggu?
FORCE ANSWER

WRITE IN : _____

(52) (53)

(c) How much does she earn from her job on average in a month?
她平均每个月賺多少錢？
Berapakah pendapatan-nya hitong panjang dalam sa-bulan?

WRITE IN : _____

(54) (55) (56) (57)

GO TO Q.46

IF NO, ASK

(d) What is the main reason why she does not work?
她不工作的主要原因是什么？
Apakah sebab utama dia tidak bekerja?

_____
_____
_____
_____
_____

(58)

HOUSEHOLD INCOME : What is the total income of all the people in your household, on average in a month including earnings from profits, dividends, interest and rents?
從各方面的入息来說，您全家从每月平均的總入息包括利益，分配金，股份和租金是多少？ Berapakah jumlah pendapatan semua ahli dalam keluarga awak, dari semua sumber, hitong panjang dalam sa-bulan, termasok pendapatan dari keuntongan, faedah dari saham, faedah dan sewaan.

WRITE IN : _____ & CODE

(59) (60) (61) (62) (63)

SHOW CARD A

What is the status of your health in general? INTERVIEWER CIRCLE RESPONDENTS RATING BY READING OUT.
您的健康情況在普通来說是怎样的？

Apakah keadaan kesehatan awak pada umum-nya?

Poor health, meaning major illnesses requiring hospitalization or frequent illnesses necessitating absence from work in the last several years Kesehatan Yang Burok, berma'na penyakit berat yang menghendakki rawatan rumah sakit atau penyakit2 yang kerap di-dapati menyebabkan tidak dapat pergi bekerja, dalam beberapa tahun yang lalu.	1	(64)
Fair health, meaning occasional illnesses and confinement to bed necessitating absence from work in the last several years Kesehatan Yang Sederhana, berma'na penyakit2 yang datang sekali sekala dan penyakit2 yang memerlukan rehat menyebabkan perlu-nya tidak bekerja, dalam beberapa tahun yang lalu.	2	
Good health, meaning minor illnesses, seldom absent from work for health reasons in the last several years Kesehatan Yang Baik, berma'na penyakit2 rengan, menyebabkan jarang tidak datang bekerja kerana sebab2 kesehatan, dalam beberapa tahun yang lalu	3	
Excellent health, meaning no illnesses in the last several years Kesehatan Yang Memuaskan, berma'na tidak mempunyai sebarang penyakit sejak beberapa tahun yang lalu?	4	

SHOW CARD B

I will read you a list of things about jobs in general (i.e. It is not necessarily referring to the present job you (respondent) are holding. Please listen and tell me which thing on the list you would prefer most in a job and rank each one accordingly.
我将讲出一些東西有关普通上的工作 (i.e. 那並不一定指你目前所做的工作, 請听清楚同時, 在这表上告訴我您在一份工作中最喜欢什么條件. 合時請您把每一个按照秩序来排列. Saya akan bachakan senari perkara2 mengenai pekerjaan pada umum-nya (ia-itu Ia tidak samesti-nya berkaitan dengan jawatan awak sekarang. Tolong dengan dan beritahu saya apa2kah butir dari senarai ini yang awak pileh dalam satu2 pekerjaan dan nyatakan sa-tiap perengkat pilehan itu?

	RANK										
Earnings	1	2	3	4	5	6	7	8	9	0	(65)
Security, no danger of Being Sacked.	1	2	3	4	5	6	7	8	9	0	(66)
Prestige & Status	1	2	3	4	5	6	7	8	9	0	(67)
Full-time work available	1	2	3	4	5	6	7	8	9	0	(68)
Not much to do on the job	1	2	3	4	5	6	7	8	9	0	(69)
Chances of promotion	1	2	3	4	5	6	7	8	9	0	(70)
A feeling of accomplishment	1	2	3	4	5	6	7	8	9	0	(71)
Proximity to home	1	2	3	4	5	6	7	8	9	0	(72)
Friends and/or relatives in the firm/factory	1	2	3	4	5	6	7	8	9	0	(73)

I would like to find out how satisfied you are with your present job considering a number of things separately. For example, compared with other people outside in a position similar to yours, would you say that your earnings are better, worse or about the same?
我想知道您对您目前的工作是否满意，请把您的工作各方面的考虑，例如，向其他外面的从向您相似的戚位来比較，您会否說您賺得的錢更多，更少或是大致相同的？Saya ingin mengetahui berapa puas hati-nya awak dengan pekerjaan awak sekarang, menimbangkan beberapa2 perkara yang berasingan. Umpama-nya membandingan dengan lain2 orang yg bekerja di-luar yang sa-jawatan dengan awak boleh-kah awak mengatakan yang gaji awak ada-lah lebeh baik, burok atau hampir2 sama?

Better	2	(75)
Same	1	
Worse	0	

In terms of the number of working hours, would you be better off, worse off or about the same as other people outside in a similar position?
对於工作時間之數目，向外面其他和您戚位相似的从来比較，您是否是更好的，更坏的或是大致相同？ Dari segi jumlah masa bekerja, adakah masa bekerja awak itu lebeh baik, burok atau sama saperti lain2 orang yang bekerja sajawatan dengan awak?

Better	2	(76)
Same	1	
Worse	0	

Now, in terms of work conditions do you think that you are better off, worse off or about average. By work conditions I mean, job security, chances of promotion and the kind of management and industrial relations you have.
現在，对於工作情况来說，您想您是更好的，更坏的或是平均一样的，我的意思有关工作情况是說，戚业的安全(保障)升戚的希望，工廠管理方式，和工业从事关係。Sekarang, dari segi keadaan bekerja, adakah awak fikir yang keadaan bekerja awak itu lebeh baik, burok atau sederhana. Keadaan bekerja, saya maksudkan jaminan pekerjaan, peluang naik pangkat dan ada-nya perhubongan pengurusan dan perindustrian.

Better	2	(77)
Same	1	
Worse	0	

Finally, let us think of your working environment which includes where your factory is located, the safety measures which are in force and the appearance and cleanliness of your work area. Do you think that your work environment is better, worse or about average compared to that of others in a similar position, outside?
最後，讓我们想想您的工作的环境，那包括您的工廠的地点，安全部队措施向在您的工作地区表面上的清潔事看，您想想您的工作环境，是否更好，更坏或者向外面其他相似的位置比較起来大致是平均一样的？ Akhir sekali, marilah kita fikirkan berkenaan keadaan sakeliling pekerjaan awak, termasok di-mana kilang awak terletak, langkah2 keselamatan yang di-kenakan dan keadaan serta kebersehan kawasan tempat awak bekerja. Adakah awak fikir bahawa keadaan sakeliling pekerjaan awak itu lebeh baik, burok atau sederhana jika di-bandingkan dengan lain2 orang yang sa-jawatan dengan awak?

Better	2	(78)
Same	1	
Worse	0	(79)

"I hereby certify that the interyiew has been carried out honestly and to the best of my ability."

Interviewer's No : 0 1 2 3 4 5 6 7 8 9
0 1 2 3 4 5 6 7 8 9

Date : ____/____/____ Interviewer's Signature : _____

PUNCHER : SKIP [illegible] 29
END CARD 3(80)

APPENDIX B

Explanation of Worker Trait Components

Those abilities, personal traits, and individual characteristics required of a worker in order to achieve average essful job performance are referred to as worker traits. Occupational information presented in volumes I II is based in part on analysis of required worker traits in terms of the six distinct worker trait components ribed in this appendix. These six components have been selected for this purpose because they provide the adest and yet most comprehensive framework for the effective presentation of worker trait information. hin this framework the user will find data concerning the requirements of jobs for: (1) The amount of general cational development and specific vocational preparation a worker must have, (2) the specific capacities and ities required of him in order to learn or perform certain tasks or duties, (3) preferences for certain types of k activities or experiences considered necessary for job success, (4) types of occupational situations to which individual must adjust, (5) physical activities required in work situations, and (6) physical surroundings valent in jobs.

Information reflecting significant worker trait requirements is contained, explicitly or by implication, in the definitions in volume I. In the Worker Traits Arrangement in volume II, the qualifications profile for each ker trait group shows the range of required traits and/or levels of traits for the first five of these components. mbers or letters are used to identify each specific trait and level. In this appendix, these identifying numbers l letters appear in italics.

e worker trait components are:

I. Training time (general educational development, specific vocational preparation)
II. Aptitudes
III. Interests
IV. Temperaments
V. Physical demands
VI. Working conditions [1]

raining Time

The amount of general educational development and specific vocational preparation required for a worker acquire the knowledge and abilities necessary for average performance in a particular job.

General Educational Development: This embraces those aspects of education (formal and informal) which ıtribute to the worker's (a) reasoning development and ability to follow instructions, and (b) acquisition of ool" knowledges, such as language and mathematical skills. It is education of a general nature which does not ve a recognized, fairly specific, occupational objective. Ordinarily such education is obtained in elementary ıool, high school, or college. It also derives from experience and individual study.

[1] Working conditions were recorded as part of each job analysis, and are reflected, when appropriate, in job definitions in volume I. However, because they did not ıtribute to the homogeneity of worker trait groups, they do not appear as a component in the Worker Traits Arrangement.

The following is a table explaining the various levels of general educational development.

GENERAL EDUCATIONAL DEVELOPMENT

Level	Reasoning Development	Mathematical Development	Language Development
6	Apply principles of logical or scientific thinking to a wide range of intellectual and practical problems. Deal with nonverbal symbolism (formulas, scientific equations, graphs, musical notes, etc.) in its most difficult phases. Deal with a variety of abstract and concrete variables. Apprehend the most abstruse classes of concepts.	Apply knowledge of advanced mathematical and statistical techniques such as differential and integral calculus, factor analysis, and probability determination, or work with a wide variety of theoretical mathematical concepts and make original applications of mathematical procedures, as in empirical and differential equations.	Comprehension and expression of a level to —Report, write, or edit articles for such publications as newspapers, magazines, and technical or scientific journals. Prepare and draw up deeds, leases, wills, mortgages, and contracts. —Prepare and deliver lectures on politics, economics, education, or science. —Interview, counsel, or advise such people as students, clients, or patients, in such matters as welfare eligibility, vocational rehabilitation, mental hygeine, or marital relations. —Evaluate engineering technical data to design buildings and bridges.
5	Apply principles of logical or scientific thinking to define problems, collect data, establish facts, and draw valid conclusions. Interpret an extensive variety of technical instructions, in books, manuals, and mathematical or diagrammatic form. Deal with several abstract and concrete variables.		
4	Apply principles of rational systems [1] to solve practical problems and deal with a variety of concrete variables in situations where only limited standardization exists. Interpret a variety of instructions furnished in written, oral, diagrammatic, or schedule form.	Perform ordinary arithmetic, algebraic, and geometric procedures in standard, practical applications.	Comprehension and expression of a level to —Transcribe dictation, make appointments for executive and handle his personal mail, interview and screen people wishing to speak to him, and write routine correspondence on own initiative. —Interview job applicants to determine work best suited for their abilities and experience, and contact employers to interest them in services of agency. —Interpret technical manuals as well as drawings and specifications, such as layouts, blueprints, and schematics.
3	Apply common sense understanding to carry out instructions furnished in written, oral, or diagrammatic form. Deal with problems involving several concrete variables in or from standardized situations.	Make arithmetic calculations involving fractions, decimals and percentages.	Comprehension and expression of a level to —File, post, and mail such material as forms, checks, receipts, and bills. —Copy data from one record to another, fill in report forms, and type all work from rough draft or corrected copy. —Interview members of household to obtain such information as age, occupation, and number of children, to be used as data for surveys, or economic studies. —Guide people on tours through historical or public buildings, describing such features as size, value, and points of interest.
2	Apply common sense understanding to carry out detailed but uninvolved written or oral instructions. Deal with problems involving a few concrete variables in or from standardized situations.	Use arithmetic to add, subtract, multiply, and divide whole numbers.	
1	Apply common sense understanding to carry out simple one- or two-step instructions. Deal with standardized situations with occasional or no variables in or from these situations encountered on the job.	Perform simple addition and subtraction, reading and copying of figures, or counting and recording.	Comprehension and expression of a level to —Learn job duties from oral instructions or demonstration. —Write identifying information, such as name and address of customer, weight, number, or type of product, on tags, or slips. —Request orally, or in writing, such supplies as linen, soap, or work materials.

[1] Examples of "principles of rational systems" are: Bookkeeping, internal combustion engines, electric wiring systems, house building, nursing, farm management, ship sailing.

Specific Vocational Preparation: The amount of time required to learn the techniques, acquire information, and develop the facility needed for average performance in a specific job-worker situation. This training may be acquired in a school, work, military, instutitional, or avocational environment. It does not include orientation training required of even every fully qualified worker to become accustomed to the special conditions of any new job. Specific vocational training includes training given in any of the following circumstances:

a. Vocational education (such as high school commercial or shop training, technical school, art school, and that part of college training which is organized around a specific vocational objective);
b. Apprentice training (for apprenticeable jobs only);
c. In-plant training (given by an employer in the form of organized classroom study);
d. On-the-job training (serving as learner or trainee on the job under the instruction of a qualified worker);
e. Essential experience in other jobs (serving in less responsible jobs which lead to the higher grade job or serving in other jobs which qualify).

The following is an explanation of the various levels of specific vocational preparation.

Level	Time	Level	Time
1	Short demonstration only.	5	Over 6 months up to and including 1 year.
2	Anything beyond short demonstration up and including 30 days.	6	Over 1 year up to and including 2 years.
3	Over 30 days up to and including 3 months.	7	Over 2 years up to and including 4 years.
4	Over 3 months up to and including 6 months.	8	Over 4 years up to and including 10 years.
		9	Over 10 years.

II. APTITUDES

Specific capacities and abilities required of an individual in order to learn or perform adequately a task or job duty.

G INTELLIGENCE: General learning ability. The ability to "catch on" or understand instructions and underlying principles. Ability to reason and make judgments. Closely related to doing well in school.

V VERBAL: Ability to understand meanings of words and ideas associated with them, and to use them effectively. To comprehend language, to understand relationships between words, and to understand meanings of whole sentences and paragraphs. To present information or ideas clearly.

N NUMERICAL: Ability to perform arithmetic operations quickly and accurately.

S SPATIAL: Ability to comprehend forms in space and understand relationships of plane and solid objects. May be used in such tasks as blueprint reading and in solving geometry problems. Frequently described as the ability to "visualize" objects of two or three dimensions, or to think visually of geometric forms.

P FORM PERCEPTION: Ability to perceive pertinent detail in objects or in pictorial or graphic material; To make visual comparisons and discriminations and see slight differences in shapes and shadings of figures and widths and lengths of lines.

Q CLERICAL PERCEPTION: Ability to perceive pertinent detail in verbal or tabular material. To observe differences in copy, to proofread words and numbers, and to avoid perceptual errors in arithmetic computation.

K MOTOR COORDINATION: Ability to coordinate eyes and hands or fingers rapidly and accurately in making precise movements with speed. Ability to make a movement response accurately and quickly.

F FINGER DEXTERITY: Ability to move the fingers and manipulate small objects with the fingers rapidly or accurately.

M MANAUL DEXTERITY: Ability to move the hands easily and skillfully. To work with the hands in placing and turning motions.

E EYE-HAND-FOOT COORDINATION: Ability to move the hand and foot coordinately with each other in accordance with visual stimuli.

C COLOR DISCRIMINATION: Ability to perceive or recognize similarities or differences in colors, or in shades or other values of the same color; to identify a particular color, or to recognize harmonious or contrasting color combinations, or to match colors accurately.

Explanation of Levels

The digits indicate how much of each aptitude the job requires for satisfactory (average) performance. The average requirements, rather than maximum or minimum, are cited. The amount required is expressed in terms of equivalent amounts possessed by segments of the general working population.

The following scale is used:

1 The top 10 percent of the population. This segment of the population possesses an extremely high degree of the aptitude.

2 The highest third exclusive of the top 10 percent of the population. This segment of the population possesses an above average or high degree of the aptitude.

3 The middle third of the population. This segment of the population possesses a medium degree of the aptitude, ranging from slightly below to slightly above average.

4 The lowest third exclusive of the bottom 10 percent of the population. This segment of the population possesses a below average or low degree of the aptitude.

5 The lowest 10 percent of the population. This segment of the population possesses a negligible degree of the aptitude.

Significant Aptitudes

Certain aptitudes appear in boldface type on the qualifications profiles for the worker trait groups. These aptitudes are considered to be occupationally significant for the specific group; i.e., essential for average successful job performance. All boldface aptitudes are not necessarily required of a worker for each individual job within a worker trait group, but some combination of them is essential in every case.

III. INTERESTS

Preferences for certain types of work activities or experiences, with accompanying rejection of contrary types of activities or experiences. Five pairs of interest factors are provided so that a positive preference for one factor of a pair also implies rejection of the other factor of that pair.

1 Situations involving a preference for activities dealing with things and objects.	vs.	*6* Situations involving a preference for activities concerned with people and the communication of ideas.
2 Situations involving a preference for activities involving business contact with people.	vs.	*7* Situations involving a preference for activities of a scientific and technical nature.
3 Situations involving a preference for activities of a routine, concrete, organized nature.	vs.	*8* Situations involving a preference for activities of an abstract and creative nature.
4 Situations involving a preference for working for people for their presumed good, as in the social welfare sense, or for dealing with people and language in social situations.	vs.	*9* Situations involving a preference for activities that are nonsocial in nature, and are carried on in relation to processes, machines, and techniques.
5 Situations involving a preference for activities resulting in prestige or the esteem of others.	vs.	*0* Situations involving a preference for activities resulting in tangible, productive satisfaction.

IV. TEMPERAMENTS

Different types of occupational situations to which workers must adjust.

1 Situations involving a variety of duties often characterized by frequent change.

2 Situations involving repetitive or short cycle operations carried out according to set procedures or sequences.

3 Situations involving doing things only under specific instruction, allowing little or no room for independent action or judgment in working out job problems.

4 Situations involving the direction, control, and planning of an entire activity or the activities of others.

5 Situations involving the necessity of dealing with people in actual job duties beyond giving and receiving instructions.

6 Situations involving working alone and apart in physical isolation from others, although the activity may be integrated with that of others.

7 Situations involving influencing people in their opinions, attitudes, or judgments about ideas or things.

8 Situations involving performing adequately under stress when confronted with the critical or unexpected or when taking risks.

9 Situations involving the evaluation (arriving at generalizations, judgments, or decisions) of information against sensory or judgmental criteria.

0 Situations involving the evaluation (arriving at generalizations, judgments, or decisions) of information against measurable or verifiable criteria.

X Situations involving the interpretation of feelings, ideas, or facts in terms of personal viewpoint.

Y Situations involving the precise attainment of set limits, tolerances, or standards.

V. PHYSICAL DEMANDS

Physical demands are those physical activities required of a worker in a job.

The physical demands referred to in this Dictionary serve as a means of expressing both the physical requirements of the job and the physical capacities (specific physical traits) a worker must have to meet the requirements. For example, "seeing" is the name of a physical demand required by many jobs (perceiving by the sense of vision), and also the name of a specific capacity possessed by many people (having the power of sight). The worker must possess physical capacities at least in an amount equal to the physical demands made by the job.

The Factors

1 **Lifting, Carrying, Pushing, and/or Pulling (Strength).** These are the primary "strength" physical requirements, and generally speaking, a person who engages in one of these activities can engage in all.

Specifically, each of these activities can be described as:

(1) Lifting: Raising or lowering an object from one level to another (includes upward pulling).

(2) Carrying: Transporting an object, usually holding it in the hands or arms or on the shoulder.

(3) Pushing: Exerting force upon an object so that the object moves away from the force (includes slapping, striking, kicking, and treadle actions).

(4) Pulling: Exerting force upon an object so that the object moves toward the force (includes jerking).

The five degrees of Physical Demands Factor No. 1 (Lifting, Carrying, Pushing, and/or Pulling), are as follows:

S Sedentary Work

Lifting 10 lbs. maximum and occasionally lifting and/or carrying such articles as dockets, ledgers, and small tools. Although a sedentary job is defined as one which involves sitting, a certain amount of walking and standing is often necessary in carrying out job duties. Jobs are sedentary if walking and standing are required only occasionally and other sedentary criteria are met.

L Light Work

Lifting 20 lbs. maximum with frequent lifting and/or carrying of objects weighing up to 10 lbs. Even though the weight lifted may be only a negligible amount, a job is in this category when it requires walking or standing to a significant degree, or when it involves sitting most of the time with a degree of pushing and pulling of arm and/or leg controls.

M Medium Work

Lifting 50 lbs. maximum with frequent lifting and/or carrying of objects weighing up to 25 lbs.

H Heavy Work

Lifting 100 lbs. maximum with frequent lifting and/or carrying of objects weighing up to 50 lbs.

V Very Heavy Work

Lifting objects in excess of 100 lbs. with frequent lifting and/or carrying of objects weighing 50 lbs. or more.

2 **Climbing and/or Balancing:**

(1) Climbing: Ascending or descending ladders, stairs, scaffolding, ramps, poles, ropes, and the like, using the feet and legs and/or hands and arms.
(2) Balancing: Maintaining body equilibrium to prevent falling when walking, standing, crouching, or running on narrow, slippery, or erratically moving surfaces; or maintaining body equilibrium when performing gymnastic feats.

3 **Stooping, Kneeling, Crouching, and/or Crawling:**

(1) Stooping: Bending the body downward and forward by bending the spine at the waist.
(2) Kneeling: Bending the legs at the knees to come to rest on the knee or knees.
(3) Crouching: Bending the body downward and forward by bending the legs and spine.
(4) Crawling: Moving about on the hands and knees or hands and feet.

4 **Reaching, Handling, Fingering, and/or Feeling:**

(1) Reaching: Extending the hands and arms in any direction.
(2) Handling: Seizing, holding, grasping, turning, or otherwise working with the hand or hands (fingering not involved).
(3) Fingering: Picking, pinching, or otherwise working with the fingers primarily (rather than with the whole hand or arm as in handling).
(4) Feeling: Perceiving such attributes of objects and materials as size, shape, temperature, or texture, by means of receptors in the skin, particularly those of the finger tips.

5 **Talking and/or Hearing:**

(1) Talking: Expressing or exchanging ideas by means of the spoken word.
(2) Hearing: Perceiving the nature of sounds by the ear.

6 **Seeing:**

Obtaining impressions through the eyes of the shape, size, distance, motion, color, or other characteristics of objects. The major visual functions are: (1) acuity, far and near, (2) depth perception, (3) field of vision, (4) accommodation, (5) color vision. The functions are defined as follows:

(1) Acuity, far – clarity of vision at 20 feet or more.
Acuity, near – clarity of vision at 20 inches or less.
(2) Depth perception – three dimensional vision. The ability to judge distance and space relationships so as to see objects where and as they actually are.
(3) Field of vision – the area that can be seen up and down or to the right or left while the eyes are fixed on a given point.

(4) Accommodation—adjustment of the lens of the eye to bring an object into sharp focus. This item is especially important when doing near-point work at varying distances from the eye.
(5) Color vision—the ability to identify and distinguish colors.

VI. WORKING CONDITIONS

Working conditions are the physical surroundings of a worker in a specific job.

1 Inside, Outside, or Both:

I Inside: Protection from weather conditions but not necessarily from temperature changes.
O Outside: No effective protection from weather.
B Both: Inside and outside.
A job is considered "inside" if the worker spends approximately 75 per cent or more of his time inside, and "outside" if he spends approximately 75 per cent or more of his time outside. A job is considered "both" if the activities occur inside or outside in approximately equal amounts.

2 Extremes of Cold Plus Temperature Changes:

(1) Extremes of Cold: Temperature sufficiently low to cause marked bodily discomfort unless the worker is provided with exceptional protection.
(2) Temperature Changes: Variations in temperature which are sufficiently marked and abrupt to cause noticeable bodily reactions.

3 Extremes of Heat Plus Temperature Changes:

(1) Extremes of Heat: Temperature sufficiently high to cause marked bodily discomfort unless the worker is provided with exceptional protection.
(2) Temperature Changes: Same as 2 (2).

4 Wet and Humid:

(1) Wet: Contact with water or other liquids.
(2) Humid: Atmospheric condition with moisture content sufficiently high to cause marked bodily discomfort.

5 Noise and Vibration:

Sufficient noise, either constant or intermittent, to cause marked distraction or possible injury to the sense of hearing and/or sufficient vibration (production of an oscillating movement or strain on the body or its extremities from repeated motion or shock) to cause bodily harm if endured day after day.

6 Hazards:

Situations in which the individual is exposed to the definite risk of bodily injury.

7 Fumes, Odors, Toxic Conditions, Dust, and Poor Ventilation:

(1) Fumes: Smoky or vaporous exhalations, usually odorous, thrown off as the result of combustion or chemical reaction.
(2) Odors: Noxious smells, either toxic or nontoxic.
(3) Toxic Conditions: Exposure to toxic dust, fumes, gases, vapors, mists, or liquids which cause general or localized disabling conditions as a result of inhalation or action on the skin.
(4) Dust: Air filled with small particles of any kind, such as textile dust, flour, wood, leather, feathers, etc., and inorganic dust, including silica and asbestos, which make the workplace unpleasant or are the source of occupational diseases.
(5) Poor Ventilation: Insufficient movement of air causing a feeling of suffocation; or exposure to drafts.

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APPENDIX C

A. HIGH LEVEL

1. Proprietor/Partner/Shareholder

Proprietor, partner, shareholder.

2. Managers

Director, chairman, managing director, general manager, factory manager, personnel manager, production manager, sales manager, financial controller, executive director, technical director, office manager, project manager, maintenance manager, marketing manager, technical manager, workshop manager, division manager, material manager, service manager, marine products manager, drawing office manager, repair manager, shipyward manager, quality control manager, operation manager, field manager, departmental manager.

3. High-level Executives

Accountnat, department head, superintendents, product co-ordinator, executive, production head, management accountant, chief accountant, accounts executive.

4. Middle-level Executives

Administrative officer, personnel officer, sales representative, confidential secretary, bill collector, purchasing officer, sales supervisor, factory administrator, financial officer, planning officer estimator, middle management executive, sales executive, senior safety promotor, senior time-keeper, technical supervisor, shipping supervisor.

5. Professionals

Chief engineer, engineer, production engineer, director of research, quality control engineer, method engineer, captain, nutritionist, milling engineer, chemist, veterinary, surgeon, pharmacist, electrical engineer, port captain, field engineer, sales engineer, computer operator/programmer.

B. LOW LEVEL

6. Work-area Supervisors

Supervisor, production supervisor, store supervisor, factory supervisor, foreman, assistant supervisor, line inspector, line leader, assistant foreman, maintenance officer, head checker, group head, chief inspector, quality control officer, security officer, stocks controller.

7. Tradesmen (high-level skills)

Technician, maintenance technician, quality control technician, designer, draftsman, apprentice technician, machinist, crew members, mechanics, electrician, welder, technical assistant, electroplaters, jade cutter, factory trainees, fitter, turner, mechanical apprentice.

8. Clerical

Secretary, clerk, cashier, accounting clerks, purchasing clerk, salesman, delivery clerk, book-keeper, receptionist, telephone operator, office assistant, telley clerk, stenographer, administrative assistant, payroll clerk, store clerk.

9. Production workers

Production workers (skilled, semi-skilled, unskilled) operatives, packaging, apprentice, cutter, printer, baker, boiler assistant, boilerman, book-binder, plate-making worker, compositor, moulders, spray painter, repairer, material handler, metal-work operators, tool-maker, ironsmith, coppersmith, factory trainee, machine operator.

Miscellaneous

10. Driver, security guard, watchman, gardener, porter, storekeeper, charge hand, attendant, office boy, cook, cleaner, messenger.

Appendix D

HEDONIC WAGE REGRESSION BY WORK EXPERIENCE

	WORKYR (0-5)	WORKYR (6-10)	WORKYR (over 11)
SCHOOLING	0.0518 (0.0084)	0.0675 (0.0082)	0.0533 (0.0060)
CHINESE	0.0151* (0.0479)	-0.4892* (0.4299)	-0.1366* (0.1862)
MALAY	-	-0.5944* (0.4342)	-0.2210* (0.1912)
EUROPEAN	-0.0519* (0.3199)	0.4495* (0.6026)	0.8406 (0.2419)
GED	0.0136* (0.0548)	-0.0771* (0.0708)	-0.0456* (0.0574)
SVP	-	0.0541* (0.0768)	0.1150 (0.0552)
SUPERVISE	0.4730 (0.0692)	0.4886 (0.0704)	0.2683 (0.0542)
NON-SEDENTARY	-0.1946 (0.0567)	-0.1602 (0.0866)	-0.3135 (0.0744)
REPETITIVE	-0.0819 (0.0489)	-0.1483 (0.0656)	-0.1477 (0.0497)
PHYSICAL DEMAND	-0.0387* (0.0552)	-0.0769* (0.0696)	-0.2041 (0.0689)
WORK ENVIRONMENT	0.0570* (0.0470)	-0.0590* (0.0628)	-0.0463* (0.0560)
FIRM SIZE	0.0139* (0.0378)	0.0507* (0.0446)	0.0625 (0.0360)
CONSTANT	-3.7619	-3.0346	-2.8634
R^2	0.5581	0.6681	0.5945
# of cases	381[a]	293	542

a 31 workers with less than six months work experience are excluded.

* not significant at 5% level.

- not used because of too few observations.

APPENDIX E

HEDONIC WAGE EQUATION AND JOB SATISFACTION REGRESSION

a. OVERALL SAMPLE

VARIABLES	COEFFICIENT	F-test
WORKYR	0.0547	149.930
$WORKYR^2$	-0.0009	36.754
SCHOOLING	0.0633	232.736
CHINESE	-0.1369	0.983
MALAYS	-0.2292	2.663
EUROPEAN	0.664	13.493
HOURSAT	-0.0143	0.260
WORKSAT 1	0.0132	0.253
WORKSAT 2	0.0164	0.439
GED	-0.1751	21.672
SVP	0.0106	0.110
SUPERVISE	0.4605	126.517
NON-SEDENTARY	-0.2594	36.754
REPETITIVE	-0.1504	23.520
PHYSICAL DEMAND	-0.1447	15.777
FIRM SIZE	0.0535	5.936
CONSTANT	-3.6185	
R^2	0.6336	
NO. OF CASES	1247	

b. BY RACE AND EDUCATION

	Chinese			Malays or Indian	
SCHOOLING	0 - 6	7 - 12	13	0 - 6	7 - 12
WORKYR	0.0343 (0.0048)	0.0557 (0.0054)	0.0577 (0.0200)	0.0444 (0.0079)	0.0481 (0.0143)
$WORKYR^2$	-0.0006 (0.0001)	-0.0009 (0.0001)	-0.0010 (0.0005)	-0.0008 (0.0001)	-0.0007 (0.0004)
WORK HOUR	0.0190* (0.0440)	-0.0083* (0.0471)	0.0647* (0.1770)	0.0329* (0.0632)	-0.1197 (0.0936)
WORKSAT 1	0.0737 (0.0423)	0.0133* (0.0415)	-0.1105 (0.1315)	-0.0265* (0.0603)	0.0611* (0.0934)
WORKSAT 2	-0.0571 (0.0382)	0.0528* (0.0390)	0.0978 (0.1352)	-0.0182* (0.0665)	0.0978* (0.0960)
GED	-0.2046 (0.0571)	-0.0526* (0.0571)	-	-0.2232* (0.2265)	-0.1181* (0.1520)
SVP	0.0755 (0.0451)	0.0731* (0.0566)	-	0.1650 (0.0842)	-0.1857* (0.1392)
SUPERVISE	0.4804 (0.0734)	0.4127 (0.0597)	1.6267 (0.7485)	0.0626* (0.2360)	0.3036 (0.1763)
NON-SEDENTARY	-0.2382 (0.0715)	-0.1482 (0.0694)	1.5224 (0.6069)	-0.2312* (0.2801)	-0.5712 (0.1725)
REPETITIVE	-0.1332 (0.0470)	-0.1043 (0.0535)	2.0630 (1.0437)	0.0613* (0.0694)	-0.3816 (0.1312)
PHYSICAL DEMAND	-0.1085 (0.0593)	-0.2149 (0.0601)	-1.7573 (0.5904)	0.1259 (0.0901)	-0.0765* (0.1206)
FIRM SIZE	0.0628 (0.0329)	0.0729 (0.0342)	-0.0825* (0.1245)	-0.0762* (0.0575)	-0.0682* (0.0912)
CONSTANT	-3.3447	-3.3961	-3.8404	-3.7019	-2.7766
R^2	0.3407	0.5780	0.2733	0.3582	0.5037
NO. OF CASES	429	517	73	101	103

c. BY OCCUPATION LEVEL

VARIABLES	High Level	F-test	Low Level	F-test
WORKYR	0.0418 (0.0140)	8.916	0.0464 (0.0029)	241.581
$WORKYR^2$	-0.0006 (0.0003)	3.863	-0.0008 (0.0000)	133.562
SCHOOLING	0.0692 (0.0140)	24.387	0.0418 (0.0042)	98.642
CHINESE	-0.4613 (0.2488)	3.435	0.2950 (0.1763)	2.798
MALAYS	-0.2675* (0.3009)	0.790	0.2111* (0.1772)	1.420
EUROPEAN	0.2050* (0.2887)	0.504	0.1121* (0.3505)	0.102
HOURSAT	0.1150* (0.1120)	1.503	-0.0240* (0.0261)	0.843
WORKSAT 1	-0.0929* (0.0946)	0.965	0.0404 (0.0246)	2.689
WORKSAT 2	0.0106* (0.0959)	0.012	0.0118* (0.0231)	0.261
GED	-1.7202 (0.5975)	8.289	-0.0788 (0.0343)	5.272
SVP	1.4048 (0.6886)	4.161	0.0814 (0.0289)	7.934
SUPERVISE	-	-	0.2873 (0.0385)	55.538
NON-SEDENTARY	-0.1757* (0.3097)	0.322	-0.1612 (0.0403)	15.966
REPETITIVE	-1.1005 (0.4094)	7.223	-0.0780 (0.0282)	7.602
PHYSICAL DEMAND	-0.0345* (0.3336)	0.011	-0.0846 (0.0329)	6.612
FIRM SIZE	0.1816 (0.0938)	3.752	0.0620 (0.0205)	7.107
CONSTANT	-2.4999	-	-5.0689	-
R^2	0.4296	-	0.4216	-
NO. OF CASES	138	-	1109	-

* not significant at 5% level

- not used because of too few observations

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